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Occupational Balance: A Time Use Study of Industrial Shift Workers

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OCCUPATIONAL BALANCE:
A TIME USE STUDY OF INDUSTRIAL SHIFT WORKERS

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CERTIFICATE OF APPROVAL

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Abstract

Despite research providing evidence for an increased prevalence of ill-health conditions, cognitive difficulties, social difficulties, and impaired work performance among night shift workers, few researchers have investigated potential causes. Grounded in occupational science theory, occupational balance (OB) and subjective quality of life (SQOL) were investigated among shift workers. Additional analysis included an examination of health status, cognitive difficulties, social difficulties, and lifestyle choices in relation to work shift, OB, and SQOL. Twenty-one full time workers of a car parts manufacturing plant completed survey packets containing a demographic sheet, time diary, and the Psychological General Well-Being Index (PGWBI). Statistically significant relationships between work shift and SQOL were found, specifically with anxiety, self-control, general health, vitality, and overall SQOL. There was no statistically significant difference between day and night shift workers for prevalence of OB. There were no statistically significant differences for work shift, OB, or SQOL scores in relation to the listed health variables. There were statistically significant relationships between work shift and SQOL with some of the cognitive and social difficulties. Occupational balance was measured in two ways as a post hoc analysis of the relationship between SQOL and OB. There was no statistically significant relationship between SQOL and Marino-Schorn's time-based definition of OB. There were statistically significant relationships between 3 out of 6 SQOL domains and Matuska and Christiansen's needs-based definition, *Life Balance* (LB). Results indicated that there was poor occupational balance among the total sample of shift workers and poor subjective quality of life among night shift workers in this study. It is recommended that shift workers of various employment areas remain a target population for occupational therapy researchers.

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Background

The United States Bureau of Labor Statistics (2005, p. 2-3) reported that in May 2004, 15% of full time workers worked an "alternative shift" including evening (4.7%), night (3.2%), irregular (3.1%), and rotating shifts (2.5%). For the purposes of this paper, night shift workers are individuals who work the hours between 11pm and 7am. Researchers have established that compared with other workers, night shift workers have a greater incidence of significant health problems such as sleep disorders (Schwartz & Roth, 2006), melatonin suppression (Cagnacci, Elliott, & Yen, 1992), metabolic and cardiovascular disorders (Biggi, Consonni, Galluzzo, Sogliani, & Costa, 2008; Karlsson, Knutsson, & Lindahl, 2001), and gastrointestinal disorders (Knutsson, 2003). Beyond knowing that shift workers experience health problems, there is minimal research on why night shift workers have health problems or what one might do as possible preventative measures.

Researchers from various disciplines offer theoretical perspectives on what might influence night shift workers to have an increased risk for health problems (Christiansen, 1996; Costa, 2003; Demerouti, Geurts, Bakker, & Euwema, 2004; Harrington, 2001; Knutsson, 2003; Lipovcan, Prizmic, & Larson, 2004; Rajaratnam & Arendt, 2001; Wilcock, 1998b). One such perspective comes from the field of occupational science. Occupational science is a field in which researchers investigate the relationship between occupation and health (Yerxa, Clark, Jackson, Pierce, & Zemke, 1990). In 1991, Clark et al. promoted occupational science as an emerging area of research guided by occupational therapists. Research areas within occupational science include how

occupation relates to and supports human life at various levels including physically, socially, mentally, emotionally, and cognitively (Yerxa et al., 1990). Given the increasing knowledge about the interplay between occupation and health, Clark et al. (1991) encouraged occupational scientists to conduct research and provide evidence to further the sustainability of the society and promote better health.

In order to understand occupational science, one must have an understanding of the concept of *occupation*. The Canadian Association of Occupational Therapists (CAOT, 1997) defined occupations as:

> groups of activities and tasks of everyday life, named, organized and given value and meaning by individuals and a culture. Occupation is everything people do to occupy themselves… (p. 34).

Wilcock (2001) argued that occupations are "complex yet so fundamental to life… occupation is what people do minute by minute, hour by hour, day by day, week by week and year by year" (p. 412). Occupational therapy practitioners use occupations as a therapeutic means to support individuals who have difficulty maintaining daily roles and responsibilities at home, in the community, and other settings (American Occupational Therapy Association, AOTA, 2008). From the inception of the profession, occupational therapists have believed that healthy living was a result of balance in the occupations of "self-care, play, work, and rest" (Rogers, 1984, p. 47), known as *occupational balance*. Marino-Schorn (1986) added a temporal concept to occupational balance when she defined it as equally distributed amounts of time in work, rest, and leisure occupations. Clark et al. (1991) identified occupational balance as an important area of research within the occupational therapy field, specifically citing a need for "an exploration of what

constitutes a healthful balance of work, rest, and leisure within the daily round of occupations" (p. 303).

The World Health Organization (WHO, 1997) explained that a person's health might also be affected by his or her quality of life. The WHO (1997) described quality of life as how the person perceived his or her successful attainment of personal goals and standards in relation to his or her culture and values. The WHO's definition of quality of life most closely matches that of the term *subjective quality of life* which includes the individual's perception of his or her well-being and satisfaction with his or her life (Bowling, 1991). *Objective quality of life* refers to the individual's status in measurable terms: physical capabilities, material ownership, income, and health (Cummins, 2000; Narvaez, Twamley, McKibbin, Heaton, & Patterson, 2008). The occupations in which a person engages allow him or her to pursue and attain personal goals (e.g. daily activities, hobbies, relationships with others, job advancement, health, and well-being) in which subjective quality of life is measured (Cummins, 2000). Occupational scientists have researched the relationship between occupation and various domains of the human experience, leading to preventative interventions targeted at reducing the prevalence and impact of societal problems (Clark et al., 1991). Health complications associated with shift work, especially night shift work, are a known societal problem (Costa, 1996; Demerouti et al., 2004) that has not been sufficiently addressed in the literature. Research targeted at shift workers in relation to occupational balance and subjective quality of life would add to the knowledge base about the relationships between occupational balance, subjective quality of life, and health.

Problem Statement

Despite research providing evidence for an increased prevalence of ill-health conditions, cognitive difficulties, social difficulties, and impaired work performance among night shift workers (Costa, 1996; Demerouti et al., 2004), few researchers have investigated potential causes. Anchored in the findings in occupational science literature, occupational therapists support the theory that occupation and subjective quality of life are related to health (Bejerholm & Eklund, 2007; Christiansen & Matuska, 2006; Clark et al., 2001; Wilcock 1993, 2001; Yerxa et al., 1990). Shift workers face significant challenges in balancing their activities of daily life (Costa, 1996, 2003; Demerouti et al., 2004), possibly resulting in occupational imbalance and thereby negatively impacting QOL (Wilcock, 1998b), and yet only one study was found related to time use and shift work (Rosenthal & Howe, 1984).

Rationale

Fifteen percent of United States employees work a shift that occurs on evening, night, irregular, or rotating schedules (United States Bureau of Labor Statistics, 2005). Physical, social, and cognitive complications have been associated with shift work, especially night shift work (Costa, 1996, 2003; Harrington, 2001; Kivimaki, Kuisma, Virtanen, & Elovainio, 2001; Knutsson, 2003; Rajaratnam & Arendt, 2001). In 1986, the WHO promoted the idea of societal conscientiousness; a society must be responsible for the health of all its members ("Enable"). As healthcare providers, it is imperative that occupational therapy practitioners promote healthy lifestyles among all members of society, including shift workers (AOTA, 2008; Clark et al., 2001). In an evolving, time-demanding, industrial society, it is impossible to eliminate shift work.

Therefore, shift workers must be a target population for research into causal and preventative measures of health, social, and cognitive challenges. Given the theory of the impact of occupation on health status, it is important that occupational imbalance be studied to investigate one possible factor that might influence the health and quality of life for shift workers, especially night shift workers.

Definitions of Terms

Alternative shift or shift work: "working hours other than normal daytime work" (Costa, Haus, & Stevens, 2010, p. 163). Daytime work has been defined as working hours that begin after 7:30 am and conclude before 6:00 pm (Costa, 2003).

Cardiovascular disease: a disease of the heart and blood vessels, synonymous with *heart disease* (American Heart Association, 2011, para. 1). Problems include heart valve complications, arrhythmia, heart attack, and stroke (American Heart Association, 2011, paragraphs 2-7).

Circadian rhythms: biological rhythms that oscillate every 24-hours, including: "blood pressure, core body temperature, hormonal fluctuations, and sexual activity" (Christiansen, 1996, p. 440).

Health: "a state of complete physical, mental, and social well-being not merely the absence of disease or infirmity" (WHO, 1948, p. 100).

Healthy worker effect: the effect of self-selected work circumstances in which individuals choose to remain in a particular work-related circumstance because they have personal characteristics that meet the work-related demands or who have developed a tolerance for the work-related circumstance (Kivimaki, Kuisma, Virtanen, & Elovainio, 2001; Lipovcan et al., 2004). Individuals who remain on

night shift because they have gained tolerance for night shift and choose to remain on night shift is a type of healthy worker effect (Lipovcan et al., 2004).

Gastrointestinal disorders: disorders of the gastrointestinal tract with common symptoms including, "abdominal pain, dyspepsia, hiccups, lump on throat, nausea and vomiting, rumination… constipation, diarrhea, and gas-related complaints" (Porter & Kaplan, 2011; "Gastrointestinal Disorders").

Leisure: desired activities that are chosen because of an individual's interest and motivation for participation; leisure occurs during discretionary time (AOTA, 2008).

Life Balance: 1. "a satisfying pattern of daily activity that is healthful, meaningful, and sustainable to an individual within the context of his or her current life circumstances" (Matuska, 2012, p. 229). 2. "a consistent pattern of occupations that results in reduced stress and improved health and well-being" (Christiansen & Matuska, 2006, p. 50).

Melatonin: a hormone that is secreted by the pineal gland whose primary function is to regulate seasonal and circadian rhythms (Brzezinski, 1997; Cagnacci et al., 1992; Rajaratnam & Arendt, 2001).

Metabolic syndrome: a syndrome in which the individual suffers from three or more of the following symptoms: "abdominal obesity… increased triglycerides… reduced HDL-cholesterol… high blood pressure… and increased fasting glucose" (Biggi et al., 2008, p. 444).

Occupations: "groups of activities and tasks of everyday life, named, organized and given value and meaning by individuals and a culture. Occupation is everything people do to occupy themselves..." (CAOT, 1997, p. 34).

Occupational balance: 1. equally distributed amounts of time in work, rest, and leisure occupations (Marino-Schorn, 1986). 2. "a healthful balance of work, rest, and leisure within the daily round of occupations" (Clark et al., 1991, p. 303). 3. a balance in "physical, mental, social and rest occupations" (Wilcock, 1998b).

Occupational imbalance: "involves a state that occurs because people's engagement in occupation fails to meet their unique physical, social, mental, or rest needs and allows insufficient time for their own occupational interests and growth as well as for the occupations each feels obliged to undertake in order to meet family, social, and community commitments" (Wilcock, 1998b, p. 138).

Occupational science: "the study of the human as an occupational being including the need for and capacity to engage in and orchestrate daily occupations in the environment over the lifespan" (Yerxa et al., 1990, p. 6).

Occupational therapy: "the therapeutic use of everyday life activities (occupations) with individuals or groups for the purpose of participation in roles and situations in home, school, workplace, community, and other settings" (AOTA, 2008, p. 673).

Quality of life: "individuals' perceptions of their position in life in the context of the culture and value system in which they live in relation to their goals, expectations, standards and concerns" (WHO, 1997, p. 1).

Rest: quiet and effortless activities that enable the mind and body to relax (Nurit & Michel, 2003).

Shift Work Sleep Disorder: "a circadian-rhythm sleep disorder resulting from a sleep-wake pattern that is out of alignment with the individual's internal circadian rhythm" (Schwartz & Roth, 2006, p. 2365).

Sleep: "a series of activities resulting in going to sleep, staying asleep, and ensuring health and safety through participation in sleep..." (AOTA, 2008, p. 632).

Subjective quality of life: the individual's perception of his or her well-being and satisfaction with his or her life (Bowling, 1991).

Well-being: "a subjective sense of overall contentment" (Christiansen & Baum, 1997, p. 606).

Work: obligatory activities in which a person engages in order to sustain life, care for self and others, or fulfill responsibilities (Wilcock, 1998b).

Purpose

The purpose of the study was to determine if there was a statistically significant difference between day and night shift workers in time spent doing occupations and the actual occupations in which shift workers engaged. The relationship between subjective quality of life and work shift was examined. Given the limited research available, it was hypothesized that night shift workers would present with occupational imbalance when compared to other shift workers. It was hypothesized that balance in occupations leads to greater subjective quality of life and subsequently increased health status. A related hypothesis was that there would be an inverse relationship between subjective quality of life and work shift, and that the poor subjective quality of life emerged from occupational imbalance and resulted in negative health status.

Chapter Two: Review of the Literature

Humans as Occupational Beings

Occupational therapy as a field was established in 1917 (Schwartz, 2009) but the scientific basis for the field did not emerge until much later. Occupational science was introduced in 1989 to provide occupational therapists with a scientific foundation to guide clinical practice (Clark et al., 1991; Yerxa et al., 1990). Occupational therapists use the outcomes of the research from occupational scientists to provide evidence-based practice for a variety of occupation-based concerns. Yerxa et al. (1990) defined occupational science as "the study of the human as an occupational being including the need for and capacity to engage in and orchestrate daily occupations in the environment over the lifespan" (p. 6). The overarching focus area was investigation of how engagement in occupation influences the health and well-being of "individuals, communities, nations, and the world" (University of Southern California, n.d., para. 4). Occupational science is used to study a person's personal experience of occupational participation, occupational balance, life satisfaction, adaptive capacity, and coping skills for changes in the demands of the environment or task (Yerxa et al., 1990).

Wilcock (1993, 1995, 1998a) wrote about the occupational nature of the human species. Wilcock (1993) explained that humans are driven to engage in activities in order to meet their biological needs such as "sustenance, self care, [and] shelter and safety" (p. 20). Wilcock (1993) further explained that occupations facilitate the development of skills, societal organization, and technology enabling the human species to be superior over predators and to flourish. Given that the brain requires stimulation in order to grow

and maintain its health and adaptability (Wilcock, 1993), Wilcock (1995) argued that engagement in occupations provides the stimulation that the brain requires.

A person's day is comprised of a variety of occupations, habits, and routines (AOTA, 2008). According to the American Occupational Therapy Association (AOTA, 2008), people occupy themselves with personal care (activities of daily living), activities that enable a person to contribute to society (instrumental activities of daily living), rest and sleep, work, leisure and recreation, and activities that involve interactions with other people (social participation). Occupational therapy practitioners assist individuals to be able to successfully participate in the occupations that make up their daily lives (AOTA, 2008).

Occupational Therapy

Occupational therapy practitioners assist individuals to function as occupational beings by creating and promoting opportunities to learn and practice skills, facilitating the establishment and restoration of lost skills, modifying the environment, adapting the task, and preventing future loss of skills for the individual (AOTA, 2008). The therapeutic process in occupational therapy includes evaluation, intervention, and assessment of outcomes (AOTA, 2008). Occupational therapy practitioners use occupations as a means and ends in the therapeutic process (AOTA, 2008). Use of occupations as a means to treatment can help the client develop the underlying skills that are necessary for a variety of everyday activities (AOTA, 2008). An example is repetitive practice of screwing and unscrewing nuts and bolts to improve fine motor control. In addition, treatment can be focused on successful participation in a specific occupation, or occupations as an end, such as self-feeding during meal times (AOTA, 2008).

Occupational therapy differs from other disciplines because it uses the act of *doing* something meaningful for the client to treat the client's disability or challenges, and often occurs in an environment as similar as possible to that of the client's environment (AOTA, 2008).

Occupation and Health

The World Health Organization (WHO) views health in ways similar to occupational scientists. In 1948, the WHO defined health as "a state of complete physical, mental, and social well-being not merely the absence of disease or infirmity" (p. 100). The WHO (1986) further explained that an individual's health relies on his or her ability to "identify and realize aspirations… satisfy needs, and … change or cope with the environment" ("Health Promotion," para. 1). Health is essential to one's quality of life and is influenced by one's personal conditions, whether biological or lifestyle choices, and the environments surrounding the person (WHO, 1986). In 1986, the WHO promoted the idea of societal conscientiousness for the health of its members and provided strategies for health promotion: "a supportive environment, access to information, life skills, and opportunities for making healthy choices" ("Enable", para. 1).

Since people realize aspirations, satisfy needs, and cope with the environment through occupations, one can assume that occupations are linked to one's health (Wilcock, 1998a). The occupations in which individuals engage can lead to a healthy or unhealthy lifestyle (Wilcock, 1998a). In return, the level of health determines the occupations in which individuals are able to engage (Wilcock, 1998a). In order to promote a healthy lifestyle, the occupations must meet the physical and psychological needs of the individual (Wilcock, 1998a).

Law, Steinwender, and Leclair (1998) performed a meta-analysis of 23 published studies, researching the link between occupation and health. The three areas of research included were "withdrawal of occupation," "addition of occupation," and "occupation as part of life" (p. 85). Law et al. (1998) found that removal of occupation led to a poorer mental and physical health status and the addition of occupation led to an increased health status. Research into occupation as part of life primarily included qualitative studies in which investigators examined relationships between time allocated to daily occupations and various conditions (e.g. aging, psychological general well-being, and spinal cord injury). Authors of the meta-analysis concluded that occupational participation was related to better health and well-being (Law et al., 1998).

Occupation and Quality of Life

Bejerholm and Eklund (2007) investigated the relationship between occupational engagement and quality of life. Time diaries were used to measure occupational engagement, which comprised of activity-rest rhythms, daily routines, variety in occupations, place of occupational engagement, social environment, social interactions, interpretation, meaningfulness of the occupations, routines, and performance initiation (Bejerholm & Eklund, 2007). Quality of life was measured with the Lancashire Quality of Life Profile, which included self-perceived ratings of "work, leisure, religion, finances, living situation, safety, family relations, social relations, and health" (Bejerholm & Eklund, 2007, p. 25). Among 74 Swedish clinical outpatients with Schizophrenia, increased occupational engagement was positively correlated with increased quality of life (Bejerholm & Eklund, 2007).

Occupational Balance

Occupational balance has been a topic of interest since the organization of the occupational therapy field in the early 1900's (Christiansen, 1996). Since the emergence of occupational balance as a research focus area, several researchers have proposed a variety of definitions of occupational balance (Christiansen, 1996; Marino-Schorn, 1986; Rogers, 1984; Wilcock, 1993, 1998b). Some of the views of occupational balance have included time use, balance in chronobiology, balanced relationship among daily occupations, fulfillment of needs, and balance in one's roles. Time use was the initial perspective for occupational balance among occupational therapists (Rogers, 1984). One study, published over 20 years ago, defined occupational balance as a time-based measure (Marino-Schorn, 1986). Papers and studies that investigated occupational balance in terms of chronobiology, balance among life tasks, and fulfillment of basic human needs were published during the 1990's (Christiansen, 1996; Wilcock, 1993, 1998b). The most recently published studies of occupational balance are those that define occupational balance in terms of life balance (Christiansen & Matuska, 2006; Matuska & Christiansen, 2008). A thorough search of the literature yielded little research to support or contradict any of the proposed perspectives of occupational balance.

Time-based approach. The founders of the occupational therapy field believed that balance in self-care, play, work, and rest occupations resulted in a healthy lifestyle (Rogers, 1984). Marino-Schorn (1986) interpreted a time-based approach to occupational balance as an equal distribution of time between work, rest, and leisure occupations. In 1986, Marino-Schorn investigated time use and morale among retired seniors. Marino-Shorn concluded that there was a positive relationship between morale (based on scores

from the Philadelphia Geriatric Center Morale Scale) and balance in time allocated to work, rest, and leisure.

Chronobiology. The theory of chronobiological balance refers to the times of day when it is best for occupations to occur. Humans have a set of innate biological processes, called *circadian rhythms* that oscillate over a specified period of time. The most prominent circadian rhythm is the sleep-wake cycle, which oscillates approximately every 25 hours, if not influenced by external factors (Christiansen, 1996). Other circadian rhythms include: "blood pressure, core body temperature, hormonal fluctuations, and sexual activity" (Christiansen, 1996, p. 440). External factors that influence the circadian rhythms are called *zeitgebers*. Zeitgebers can be physical such as lightness, darkness, and noise. Zeitgebers can also be social such as meal times and bed times (Christiansen, 1996). Circadian rhythms are maintained when the physical and social zeitgebers are synchronized (Christiansen, 1996). Desynchronization occurs when the social zeitgebers occur at times that conflict with the physical zeitgebers (Christiansen, 1996). For example, shift workers who are awake and working during the dark hours of the night are not synchronized as individuals who are asleep during the dark hours. Desynchronization can alter the rhythms of the physiological processes such as cell reproduction and hormone secretion (Christiansen, 1996; Costa et al., 2010).

Balance among life tasks. The theory of balance among life tasks refers to the relationships between the individual's goals (Christiansen, 1996). For example, if an individual has three goals, such as to earn a degree in science, save enough money to go on vacation, and find a partner, the individual's occupational balance is based on the level of congruency or conflict between the goals. The individual decides if each of the goals

support, hinder, or are neutral for the remaining goals (Christiansen, 1996). The greater the frequency of supports rather than barriers, the greater the occupational balance and sense of control in one's life (Christiansen, 1996). On the other hand, increased rates of conflict between the various personal goals might result in a degree of disorganization, loss of control in one's life, and decreased likelihood of a sense of well-being (Christiansen, 1996).

Needs-based approach. Another view of occupational balance is based on fulfillment of an individual's needs. Wilcock (1993, 1998b) and Christiansen and Matuska (2006) have proposed theories for a needs-based approach to occupational balance. The researchers argued that occupational balance is determined by how well the occupations in which an individual engages fulfill the individual's needs (Wilcock 1993, 1998b; Christiansen & Matuska, 2006).

Wilcock (1993) suggested that in order for a person to maintain occupational balance, one must fulfill one's physical, social, mental, and rest needs. One must also devote sufficient time to occupations that pertain to one's interests, goals, and obligations to family and society (Wilcock, 1998b). Wilcock et al. (1997) conducted a research study investigating the relationship between occupational balance and health. Participants included 146 South Australian residents, all of whom were Caucasian (Wilcock et al., 1997). The participants were asked to rate their current and ideal levels of participation in physical, mental, social, and rest occupations on a 4-point Likert scale including *none*, *low*, *moderate*, and *high* participation (Wilcock et al., 1997). Occupational balance was determined as the variance in ideal level of participation versus current level of participation for each of the categories: physical, mental, social, and rest. Participants

rated their health status using a visual-analog scale where "1" corresponded to poor health and "5" corresponded to excellent health (Wilcock et al., 1997). Wilcock et al. (1997) concluded that the lesser the variance in the four occupational areas, the higher the health scores. The healthiest participants were individuals with greater levels of occupational balance (Wilcock et al., 1997).

Wilcock (1998b) defined the concepts of *occupational imbalance*, *occupational deprivation*, and *occupational alienation*. Occupational imbalance refers to an imbalance in participation between work, rest, and play occupations as when an individual works a disproportionate number of hours in a day (Wilcock, 1998b). Occupational deprivation occurs when an outside agency or circumstance inhibits a person from engaging in occupations as when children with disabilities are not provided access to playgrounds (Wilcock, 1998b). Occupational alienation occurs when something takes over the duties of the task replacing the need for humans to engage in the activity, as when equipment is designed to mass-produce a product that was originally manufactured by people (Wilcock, 1998b). Collectively, occupational imbalance, deprivation, and alienation lead to negative effects on the physiological and emotional systems (Wilcock, 1998b). Boredom occurs when there is a lack of occupation and burnout occurs when there is too much occupation. Wilcock (1998b) identified negative side effects to the boredom and burnout associated with occupational imbalance, deprivation, and alienation, which included depression, increased body weight, decreased physical fitness, brain and liver dysfunction, increased blood pressure, and disrupted sleep habits.

Life Balance. In 2006, Christiansen and Matuska proposed the concept of *Lifestyle Balance*. Lifestyle balance has since been renamed as *Life Balance* (LB) and is

the term that is used for the purposes of this paper. Christiansen and Matuska (2006) defined life balance as "a consistent pattern of occupations that results in reduced stress and improved health and well-being" (p. 50). The authors outlined the subcomponents of life balance including time use, role fulfillment, psychological need fulfillment, and congruency between occupational participation and chronobiology. Christiansen and Matuska (2006) expanded the traditional perspective of time-based occupational balance into a more holistic and comprehensive perspective of life balance. The authors suggested that a time-based-only view of life balance neglects other important components of occupational participation, such as the meaning of the occupation to the participant and how routines affect the individual's well-being. Time use (supplemented by qualitative information) is essential to analyzing life balance because it offers insight into the activities in which the participant engages and the time of day in which the activities occur (Christiansen & Matuska, 2006). Inherent in an individual's life are the roles that he or she has acquired and the occupations and responsibilities that are required in those roles (Christiansen & Matuska, 2006; Kielhofner, 2008). An individual's roles might determine when, where, and how frequently an occupation must occur, as well as the meaningfulness of that occupation (Kielhofner, 2008).

Role balance includes the individual's ability to fulfill the obligations and demands that the role requires (Christiansen & Matuska, 2006). An individual contributes to his or her psychological needs through role fulfillment (Christiansen & Matuska, 2006). When an individual is unable to fulfill the responsibilities inherent in his or her roles as a result of strain and burden imposed by the role, he or she has a decreased level of life balance and decreased well-being (Christiansen & Matuska, 2006).

Wagman, Bjorklund, Hakansson, Jacobsson, and Falkmer (2011) investigated participants' perceptions of what constituted life balance within a population of working adults in Sweden. Participants generally perceived life balance as multidimensional and unique to each person and his or her circumstances (Wagman et al., 2011). The dimensions that were included in life balance were *activity balance*, *balance in body and mind*, *balance in relation to others*, and *time balance* (Wagman et al., 2011). In a related study, participants were asked to rate the importance of various constructs to their life balance on an 11-point Likert Scale ranging from -5 to +5 (Wagman, Hakansson, Jacobsson, Falkmer, & Bjorklund, in press). Least important to life balance corresponded with -5 while +5 corresponded with most important to life balance (Wagman et al., in press). Participants were categorized into four groups based on similar viewpoints, namely Viewpoint 1, Viewpoint 2, Viewpoint 3, and Viewpoint 4 (Wagman et al., in press). Responses for the statement, "that I have sufficient time for both what I want to do and what I have to do," ranged from -1 to 4, indicating that feelings for the importance of available time for occupations ranged from neutral to most important for life balance (Wagman et al., in press). Responses for the statement, "that I have sufficient balance between work, home, family activities, and leisure activities" ranged from -3 to 5, indicating that there was a high variability in perceived importance of balance between the listed activity categories (Wagman et al., in press). The participants of the study were generally concerned with having enough time to do everything they needed to do, but not necessarily concerned with the level of balance between various daily activities (Wagman et al., in press).

Shift Workers as a Population at Risk for Occupational Imbalance

With advancements in technology, market demands, and a desire to maximize profits, employers have embraced the 24-hour shift system (Costa, 2003). Some professions currently using the 24-hour system include: production (e.g. chemical, steel, and printing), service (e.g. hospitals, gas and electric, and hotels), and entertainment (Costa, 2003). The U.S. Bureau of Labor Statistics (2005, p. 3) reported the reasons for which individuals worked the alternative shift: "nature of the job" (54.6%), "personal preference" (11.5%), "better arrangements for family or child care" (8.2%), "could not get any other job" (8.1%), and "better pay" (6.8%). There are several shift systems in effect throughout industrialized societies (Costa, 2003). Some employers use 6 to 12 hour shifts, some include 2 to 4 shifts a day, some include work on Sundays, some rotate shifts each week, and others stay on a shift for several months at a time and then rotate (Costa, 2003).

Individuals engaged in shift work are at risk for occupational imbalance (Christiansen, 1996; Wilcock, 1998b). Wilcock (1998b) explained that shift work can lead to challenges in emotional regulation such as irritability and mood swings. Shift work can also lead to cognitive difficulties such as "diminished concentration…diminished functional capabilities… and increased susceptibility to accidents" (Wilcock, 1998b, p. 142). Shift work can affect one's energy level and physical well-being such as through "stomach complaints" (Wilcock, 1998b, p. 142). Wilcock (1998b) argued that the reason shift workers have these challenges is because of occupational imbalance, meaning that shift workers are not successfully meeting their physical, mental, social, and rest needs by the occupations in which they engage.

Studies of Occupational Balance

Despite the theories that shift work results in occupational imbalance (Christiansen, 1996; Wilcock, 1998b), only one study was found in the literature in which occupational participation among shift workers was investigated (Rosenthal & Howe, 1984). Rosenthal and Howe (1984) studied differences between day and night shift industrial workers in regards to the occupations in which they participated as well as their perceptions of leisure. The authors used a researcher-designed questionnaire to measure the participants' time spent in occupations (Rosenthal & Howe, 1984). The questionnaire included questions such as duration, motivation, meaningfulness, and the presence of others while participating in the occupation (Rosenthal & Howe, 1984).

Fifty employees who worked on a production line in a small manufacturing company were surveyed (Rosenthal and Howe, 1984). Of the 50 employees, 25 were day shift workers and 25 were night shift workers. Rosenthal and Howe (1984) found that day shift employees, on average, spent more time in cultural, educational, physical sport, and social recreational activities than night shift employees. Although there were no statistically significant differences between the two groups in relation to time spent in work, rest, or self-care, night shift employees reported extreme sleep patterns, such as sleeping less than four or more than ten hours at a time (Rosenthal & Howe, 1984).

Of the 50 participants in Rosenthal and Howe's study, twice as many day shift workers were satisfied with the amount of free time they had, when compared to night shift workers. The amount of free time that the night shift workers reported ranged from no free time to having too much free time. The conclusion was that there was no statistically significant difference in occupational balance (time allotted to work, rest,

self-care, or leisure) between the day and night shift workers (Rosenthal & Howe, 1984). Although objectively, night shift workers experienced less time engaged in leisure occupations, subjectively, day and night shift workers were equally dissatisfied with the amount of time they allotted to leisure pursuits (Rosenthal & Howe, 1984).

Subjective Quality of Life

Quality of life has been defined as "individuals' perception of their position in life in the context of the culture and value systems in which they live in relation to their goals, expectations, standards and concerns" (WHO, 1997, p. 1). The WHO (1997) argued that quality of life "is a broad ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationships to salient features of their environment" (p. 1). Quality of life can be evaluated based on subjective and objective criteria. Subjective quality of life (SQOL) includes the individual's perceptions about his or her well-being and life satisfaction (Bowling, 1991). Objective quality of life includes the individual's functional capabilities, material ownership (e.g. housing, work, income), health status, and access to resources (Cummins, 2000; Narvaez et al., 2008). One way of assessing a person's health and well-being is to examine his or her quality of life. Wilcock et al. (1997) hypothesized that overall contentment, synonymous with well-being, is the result of positive affect and life satisfaction.

Lipovcan, Prizmic, and Larson (2004) studied the differences between day and night shift workers in relation to total quality of life, subdomains of quality of life, happiness, and life satisfaction. The subdomains of quality of life included *being*, *belonging*, and *becoming*. The Being subdomain focused on the individual's roles, skills,

and occupations. The Belonging subdomain focused on how one belongs to the physical environment. The Becoming subdomain focused on engagement in occupations related to achieving the individual's goals. Social care professionals located in 75 cities in Croatia were studied. Participants included 311 people who worked rotating shifts that included the night shift (*night shift workers*), 207 people who worked morning and afternoon rotating shifts (*day shift workers*), and 1,210 people who were not shift workers (*non-shift workers*). The dependent variables were measured by a variety of surveys that were specialized to each of the dependent variables (Lipovcan et al., 2004).

The researchers found that night shift workers had lower quality of life scores for the physical being, spiritual being, and community belonging subdomains than day shift and non-shift workers (Lipovcan et al., 2004). In addition, night shift workers felt that they did not have sufficient opportunities to improve their physical being; increase their leisure pursuits; or maintain their personal growth, psychological being or practical becoming when compared to day shift and non-shift workers. There were no statistically significant differences between the groups in relation to total quality of life, happiness, or life satisfaction (Lipovcan et al., 2004).

Lipovcan et al. (2004) analyzed the data further for age-differences in happiness and satisfaction. Among the night shift workers, the younger participants reported being less happy and satisfied than the older participants. On the other hand, the younger daytime workers were more happy and satisfied than the older daytime workers. The researchers hypothesized that night shift work more negatively affects young workers for two reasons: work-life balance and shift tolerance (Lipovcan et al., 2004). It is possible that younger workers have increased roles and family responsibilities that are susceptible

to disruption. In addition, older night shift workers may have chosen to stay on night shift due to tolerance for shift work, known as the *healthy worker effect* (Kivimaki et al., 2001; Lipovcan et al., 2004). The healthy worker effect is the premise that individuals who choose to work night shifts do so because they have the stamina and physical ability to meet the demands of working the night shift (Kivimaki et al., 2001). Individuals who do not have the stamina and physical ability to work the night shift find other employment opportunities that include daytime hours (Kivimaki et al., 2001). Length of time the participant had been working the night shift was not used to investigate differences among age groups in Lipovcan et. al's (2004) study. It is possible that older workers had more time on the night shift and therefore had more time to adjust to the schedule.

Physical Well-being and Shift Workers

Shift work can lead to a disturbed circadian rhythm, which is known as the body's "internal clock." The physiological functions that are rhythmic include the respiratory, cardiovascular, digestive, and renal systems (Harrington, 2001). Harrington (2001) explained that circadian rhythms affect "body temperature, respiratory rate, urinary excretion, cell division, and hormone production" (p. 69). Harrington (2001) reported that reproductive health is a concern for women who work the night shift. Miscarriages, babies born with low birth weights, and prematurity are common problems for women who are night shift workers (Harrington, 2001).

It is rare for a person to completely invert his or her circadian rhythm, regardless of how long he or she has worked the night shift (Costa, 1996, 2003). Drake, Roehrs, Richardson, Walsh, and Roth (2004) noted that one reason night shift workers cannot completely adapt to the reversed sleep-wake cycle is because it is difficult to have

complete darkness during the day sleeping hours. Secretion of melatonin, the hormone that is responsible for maintaining the circadian rhythm, occurs primarily while the person is in complete darkness (Rajaratnam & Arendt, 2001). It has been reported that there is decreased enzymatic activity for digesting and metabolizing food during the work shift of night shift workers (Culpepper, 2010) and higher rates of obesity (Karlsson et al., 2001). In addition to the natural physiological processes of the body, inconsistent routines make it difficult for a person to invert his or her circadian rhythm (Christiansen, 1996). It is commonly suggested that night shift workers maintain their sleep-wake schedule each day but many night shift workers return to the typical sleep-wake schedule (awake during the day and asleep during the night) on the days they are not working (Culpepper, 2010; Folkard & Tucker, 2003).

Shift Work Sleep Disorder (SWSD). Sleep is an area of occupation and encompasses the activities related to preparing for sleep and participating in sleep (AOTA, 2008). Sleep is necessary for successful occupational participation and deficiency in sleep leads to a number of negative effects (Wilcock, 1998b). Green (2008) explained that sleep is goal directed (used for rest and recovery), influenced by the environment in which it occurs, and can be meaningful for the person. In order for successful participation in sleep, one must be calm, have an internal drive to sleep (due to amount of time that has passed since the last sleeping episode), and have a regulated circadian rhythm (Green, 2008).

Shift Work Sleep Disorder (SWSD) is defined as "a circadian-rhythm sleep disorder resulting from a sleep-wake pattern that is out of alignment with the individual's internal circadian rhythm" (Schwartz & Roth, 2006, p. 2365). Night shift workers are

typically awake at night and asleep during the day. The two primary symptoms of SWSD for night shift workers are excessive sleepiness during the night hours and/or insomnia during the day hours (Schwartz & Roth, 2006). Researchers reported that between 14 and 32% of night shift workers and between 8 and 26% of rotating shift workers were diagnosed with SWSD, using self-reported cases of insomnia and excessive sleepiness (Drake et al., 2004). Phone interviews included questions relating to the diagnostic criteria for insomnia as outlined in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) as well as the diagnostic criteria for excessive sleepiness as outlined in the Epworth Sleepiness Scale (Drake et al., 2004). Excessive sleepiness during awake hours occurred in 45% of night shift, 36% of rotating, and 33% of day shift workers. Insomnia during sleep hours occurred in 19% of night shift, 16% of rotating shift, and 9% of day shift workers (Schwartz & Roth, 2006). Schwartz and Roth (2006) explained that the problems associated with night shift work such as fatigue, disturbed social relationships, cognitive deficits, and poorer quality of life were escalated when someone had Shift Work Sleep Disorder. Night shift workers with SWSD were up to 4 times more likely to have a peptic ulcer than night and rotating shift workers without SWSD. Night shift workers with SWSD were also up to 14 times more likely to miss family and social events than day shift workers without SWSD (Schwartz & Roth, 2006).

Night shift workers may lose up to 2 hours of sleep when compared to day shift workers, and experience a lesser quality of sleep (Harrington, 2001). Drake et al. (2004) examined the prevalence of SWSD in night and rotating-shift workers by conducting 3,283 telephone interviews of adults, ages 18-65 years living in Detroit. The interview questions included those related to work status and shift, sleep habits, feelings of

sleepiness or insomnia, disability, and the participant's psychiatric history. When comparing night and rotating-shift workers with daytime workers, Drake et al. (2004) found that night workers experienced less total sleep time, time in bed, sleep efficiency, and a related increased prevalence of excessive sleepiness. A variety of noises that occur during the day (e.g. cars, household appliances, children outside, telephone, and doorbell) might make it difficult for a night shift worker to sleep during the day.

Melatonin. Melatonin is the primary hormone that regulates the circadian rhythms. It is secreted from the pineal gland during the darkness of the early morning hours, usually between 4 and 6 a.m. (Rajaratnam & Arendt, 2001). Melatonin secretion is closely associated with sleep (Brzezinski, 1997) and core body temperature (Cagnacci et al., 1992). During periods of darkness, information flows from the retina to the suprachiasmatic nucleus of the hypothalamus. The hypothalamus then secretes norepinephrine, which travels to the pineal gland. Finally, the pineal gland outputs melatonin (Brzezinski, 1997; Cagnacci et al., 1992). This process is inhibited by light. Some researchers have hypothesized that night shift workers, who are exposed to fluorescent light at work during the early morning hours when melatonin is normally secreted, might have melatonin deficiency (Rajaratnam & Arendt, 2001). Researchers have found that among permanent, non-rotating shift workers, melatonin supplements and other actions to control light (e.g. wearing dark sunglasses when leaving work after a night shift) can facilitate melatonin secretion and adjustment to changes in work shift (Martinez & Lenz, 2010; Rajaratnam & Arendt, 2001).

In addition to circadian rhythm maintenance, melatonin might play a role in the prevention of cyclic mood disorders such as seasonal affective disorder and depression,

maintenance of reproductive systems, cancer prevention, and enhanced immune systems (Brzezinski, 1997). Shift work has been recently labeled as "probably carcinogenic to humans" (Straif et al., 2007, p. 1065), for which decreased melatonin secretion is a common hypothesis (Costa et al., 2010; Culpepper, 2010; Davis, Mirick, & Stevens, 2001; Megdale, Kroenke, Laden, Pukkala, & Schernhammer, 2005). In particular, melatonin suppression has been linked to an increased prevalence of breast and prostate cancers (Costa et al., 2010) probably because of the interplay between the endocrine system and the breast and prostate tissues. Researchers have reported that female night shift workers have a 48% higher prevalence of breast cancer (Megdale et al., 2005). Percentages have not been calculated for risk of prostate or other cancers among night shift workers.

Metabolic Disorders and Cardiovascular Disease. As a possible result of disrupted circadian rhythms and lifestyle factors such as stress, smoking, and inadequate diet and exercise, shift workers have a 40% higher risk of cardiovascular disease (Harrington, 2001). Costa (1996) mentioned that shift work is associated with the additional risk factors of increased levels of cortisol and catecholamines, which are hormones secreted from the adrenal gland as a result of stress. Cortisol and catecholamines affect blood pressure, heart rate, and lipid and glucose metabolism. Rajaratnam and Arendt (2001) explained that a meal eaten during the night shift leads to higher levels of plasma triacylglycerol (which is linked to cardiovascular disease) when compared to day shift workers.

Karlsson, Knutsson, and Lindahl (2001) explored the correlation of metabolic risk factors (hypertension, BMI, and glucose tolerance) and shift work. The participants were

employed residents of Vasterbotton County in Sweden who participated in a health survey offered by the Vasterbotton intervention program. Included in the study were 27,485 participants of whom 7,909 were shift workers and 19,576 were day workers (non-shift workers). Shift workers were individuals who answered, "yes" to the question "do you have shift work, or do you work during weekends?" (Karlsson et al., 2001, p. 748) The researchers found that obesity, increased triglycerides, and low HDL were prevalent in the shift workers. There were no statistically significant differences in hypertension or diabetes between shift workers and day workers (Karlsson et al., 2001). The researchers hypothesized that there might be a relationship between shift work and metabolic syndrome (Karlsson et al., 2001).

Biggi et al. (2008) explored the relationships between permanent night shift work and metabolic and cardiovascular risk factors including smoking, alcohol consumption, body mass index (BMI), glucose, cholesterol, triglycerides, blood pressure, diabetes, coronary heart disease, and hypertension. The participants were 488 Italian male workers who were street cleaners and garbage collectors. Of the 488 participants, there were 157 day shift workers (all of whom had always worked the day shift), and 331 night shift workers (12 who had always worked the night shift and 319 who had worked on both shifts). The researchers found that there were higher incidences of smoking, alcohol use, increased BMI, high cholesterol, and high levels of triglycerides among the night shift workers (Biggi et al., 2008). There were no statistically significant differences in hypertension or diabetes between night and day shift workers (Biggi et al., 2008). The researchers reported that although the participants did not meet all of the five criteria for metabolic syndrome, there is an increased prevalence of metabolic disturbances among

night shift workers (Biggi et al., 2008). The results of Biggi et al.'s (2008) study are consistent with the results of Karlsson et al.'s (2001) study, indicating that night shift workers have an increased risk for developing a metabolic disorder.

Kivimaki, Kuisma, Virtanen, and Elovainio (2001) measured smoking, alcohol use, physical activity, and BMI among 689 Finnish female nurses. There were 506 night shift workers and 183 day shift workers. The researchers found that there was a higher prevalence of smoking and obesity among night shift nurses. Alcohol consumption and physical activity were not significantly different between the two groups (Kivimaki et al., 2001).

Gastrointestinal Disorders. Gastrointestinal disorder is another problem prevalent among shift workers (Costa, 1996). Night shift workers are more prone to consume convenience foods such as pre-packaged food and energy drinks such as coffee and tea (Costa, 1996). Although only 10-25% of daytime workers complain of "disturbances of appetite, irregularity of bowel movements with prevalent constipation, dyspepsia, heartburn, abdominal pains, grumbling and flatulence," 20-75% of night shift workers complain of the same problems (Costa, 1996, p. 10). In addition, night shift workers have two to five times more prevalence of peptic ulcers (Costa, 1996). Given the wide ranges for prevalence of gastrointestinal disturbances in night shift workers, the actual prevalence of the health concern is unknown.

Social Well-being and Shift Workers

Shift work can strain marital and parent-child relationships (Costa, 1996, 2003). Shift work might interfere with family relationships and responsibilities because the activities and hours of community resources (e.g. stores) do not coincide with the times

when the night shift worker sleeps. Costa (2003) explained that shift workers who suffer from SWSD are 5.7 times more likely to miss family and social activities. Night shift workers with SWSD missed family and social activities 8.6 days on average per month while night shift workers without SWSD missed 1.5 days on average per month (Costa, 2003). In addition, the night shift worker might not be able to fulfill his or her roles and responsibilities (Costa, 1996, 2003). Some of the family aspects affected by night shift work include caring for children, doing household chores, shopping, and leaving a partner home alone at night (Harrington, 2001). Studies examining the effects of shift work on relationships outside of the immediate family or related to social participation have yet to be published.

Accidents and Injuries

Shift work, particularly the night shift, can lead to compromised "memory consolidation, alertness, and performance," as a result of excessive sleepiness (Culpepper, 2010, p. S6). Variability in work performance, slowed reaction time, and decreased motivation are additional risk factors for night shift workers (Rajaratnam & Arendt, 2001). The most notable work accidents that occurred at two nuclear power plants, Three Mile Island and Chernobyl, occurred during the night shift and were reported to be a result of shift scheduling and fatigue (Price & Holley, 1990). No studies were found in which the economic impact of injuries, accidents, and decreased performance while at work were investigated.

There is a higher prevalence of automobile accidents among night shift workers (Culpepper, 2010; Monk, Folkard, & Wedderburn, 1996). Researchers have investigated the incidences of automobile accidents among medical personnel who work the night

shift (Scott et al., 2007; Steele, Ma, Watson, Thomas, & Muelleman, 1999). One study found that 79% of nurses who worked the night shift had experienced drowsiness on at least one occasion on the commute home from a night shift, during the 4-week study (Scott et al., 2007). Another study found that among emergency medicine residents, vehicle accidents occurred on the commute home in 74% of night shift workers versus 12% of day workers (Steele et al., 1999).

In an attempt to begin the discussion about costs related to sleepiness, Culpepper (2010, p. S8) examined data from 1988 about motor vehicle accidents that were a result of excessive sleepiness and found the cost to be between "$29 billion and $38 billion annually ($53 billion and $69 billion, when adjusted to 2009 values)." Culpepper (2010, p. S8) reported that work related accidents, "including deaths and disabling accidents," cost between "$10 billion and $13 billion annually ($18 billion and $24 billion when adjusted to 2009 values)."

Summary

Humans are occupational in nature; they are driven to participate in daily activities that meet their biological needs (Wilcock, 1993). Occupational science was developed as a research-based discipline to investigate the interplay between occupations and the human experience, particularly the relationship between occupation and health (Clark et al., 1991). Occupational therapists use the research findings from occupational science to guide their clinical practice in order to support individuals coping with daily activities and demands (AOTA, 2008). Shift workers, especially night shift workers, are at risk for compromised health, specifically in relation to Shift Work Sleep Disorder (Drake et al., 2004; Schwartz & Roth, 2006), melatonin suppression (Costa et al., 2010;

Culpepper, 2010; Davis et al., 2001; Megdale et al., 2005; Rajaratnam & Arendt, 2001), metabolic disorders (Biggi et al., 2008; Karlsson et al., 2001), cardiovascular disease (Biggi et al., 2008), gastrointestinal disorders (Costa, 1996), social wellbeing (Costa, 1996; 2003; Harrington, 2001), and work-related accidents and injuries (Culpepper, 2010; Rajaratnam & Arendt, 2001). It is hypothesized that desynchronized circadian rhythms, and subsequently occupational imbalance and decreased subjective quality of life, are influential factors in the decreased health status of night shift workers.

Given the few studies that have examined occupational balance among shift workers, the study described herein investigated the relationships of occupational balance and subjective quality of life to work shift among industrial workers. Contained in chapter 3 is a discussion of the methodology used to conduct the study.

Chapter Three: Methods and Procedures

Described in chapter 3 are the methods and procedures with which the study was conducted. Limitations, delimitations, assumptions, participants and recruitment, operationalization of variables, outcome measures, data collection, and data analysis are explained. Research questions were developed using occupational science as a theoretical foundation.

Research Questions

The primary focus of the study was to answer the following questions about workers employed in an industrial setting:

1. Is there a statistically significant difference between day and night shift workers for the prevalence of occupational balance?
2. Is there a statistically significant relationship between work shift and subjective quality of life?

Secondary research questions included the following:

1. (a) Is there a statistically significant difference between day and night shift workers for the prevalence of ill-health conditions and types of lifestyle choices? (b) Are there statistically significant relationships of cognitive difficulties and social difficulties with work shift?
2. Are there statistically significant relationships of health status, cognitive difficulties, and social difficulties with occupational balance?

3: (a) Is there a statistically significant difference between the three categorical SQOL scores for the prevalence of ill-health conditions? (b) Are there statistically significant relationships of cognitive difficulties and social difficulties with subjective quality of life?

To answer these questions, a survey design consisting of a time diary and subjective quality of life questionnaire was used. Participants included employees at an auto parts manufacturing plant who worked either first, second, or third shift.

Limitations, Delimitations, Assumptions

Limitations. The current study was limited in sample size and available survey instruments. There was a small sample size because of limited access to recruitment of potential participants as well as a low response rate. At the commencement of the study, little research had been done to investigate time use and subjective quality of life among shift workers within the occupational therapy field. As a result, the survey packets included two researcher-developed surveys and one questionnaire that was originally developed for psychological research.

Delimitations. The current study was delimited to a convenience sample of full time industrial shift workers who worked in central New York state. The focus area of industrial workers was determined by the increased prevalence of industrial companies within the target geographical location when compared to other areas of employment that included 24-hour shift systems. Permission to recruit employees for the study was completed by utilizing various contact methods in order to promote increased generalizability of results. Two companies initially granted permission to recruit employees, one of which retracted permission due to company reorganization. The

company that was ultimately used for recruitment of participants was an auto parts manufacturing company. Generalizability of results was limited because only one company was used for recruitment of participants.

The number of potential participants for the study was limited to the number of employees at the auto parts manufacturing plant, which was 1,104 employees. In order to promote an increased response rate among the employees, a $100 gift card was offered as an incentive for participation. A drawing for the incentive prize was completed and the prize was mailed to the winner. The prizewinner consented to his name being announced to the employees of the company. The head of Human Resources was notified of the winner, who then forwarded the details to the shift managers.

The auto parts manufacturing company employed various types of shift systems, which made it difficult to present the study to all employees at one time. In order to present the study to all of the employees, the researcher attended all of the weekly shift overlap meetings for all of the departments on the production line. At times, the presentations occurred in loud locations making it difficult for some employees to hear the presentation. In order to give all employees access to details about the research study, contact cards were given to each employee at the shift overlap meeting. The contact cards had detailed information for contacting the researcher and research assistant for individuals interested in more information or participation in the study.

During recruitment, several employees questioned the personal benefit they would receive from participation in the study. To encourage participation in the study, the employees were informed that at the conclusion of the study, results would be made available to all employees including any trends and possible indicators for decreased

health and subjective quality of life. A packet including a results sheet and tip sheet for the use of the employees of the company was formulated after the conclusion of the study. The results sheet included the details of the study including background information, methodology, results, and discussion. The tip sheet included strategies for promoting positive well-being and quality of life for shift workers. Picard's (2011) presentation on sleep habits at the 2011 American Occupational Therapy Association Annual Conference was used as a reference when formulating the tip sheet.

Initially, access to the survey packets was limited to individuals who contacted the research assistant. After a low response rate, 600 survey packets were equally distributed to the production line managers along with statements of second contact. Paper and online versions of the surveys were made available to increase access and allow for participant preference. A potential limitation of the survey packets was a language barrier for individuals who could not fluently read and understand the English language as written on the survey packets. Eligibility for participation in the study was restricted to individuals who could read and understand English versions of the surveys. Return envelopes were included in the survey packets that were printed with prepaid postage. The time of year at which the study commenced was a potential limitation because it occurred during the holiday season and when production levels were high, allowing overtime opportunities. The deadline for responses was extended beyond the holiday season to accommodate for busy schedules.

The survey instruments posed potential limitations. No outcome measures were found in occupational therapy literature that measured occupational balance or subjective quality of life, for which validity and reliability were established. One study measured

occupational balance as a time-budget definition, in which a researcher-developed activity log was utilized (Marino-Schorn, 1986).

In order to measure subjective quality of life in its true form of personal perception, all quality of life measures that used evaluator-determined levels of quality of life were excluded. One measure was found in psychology literature that was a self-rated quality of life questionnaire that included self-perceived levels of well-being (e.g. anxiety, depressed mood, positive well-being, self control, general health, and vitality), which was the Psychological General Well-being Index (PGWBI, Dupuy, 1984). Content validity was not analyzed for the researcher-developed time diary or demographic sheet that were used in the current study; however, the content of the survey instruments were taken strictly from the findings in the literature review.

Assumptions. Several assumptions were made when designing the current research study. The first assumption was that a study of occupational balance (OB) and subjective quality of life (SQOL) was relevant to occupational therapy and OB and SQOL were related to one's health and well-being. Occupational therapy is an allied healthcare profession in which practitioners promote increased health and well-being through the use of occupational engagement (AOTA, 2008). The founders of the occupational therapy field believed that occupational balance influenced one's health and well-being (Rogers, 1984). Since the establishment of occupational science as a discipline, researchers have promoted occupational balance as a focus area for continued research, particularly in how occupational balance is related to health (Clark et al., 1991). Occupational therapists who have investigated occupational balance and its relation to health include Wilcock (1998b), Christiansen (2006), and Matuska (2012). The World

Health Organization (WHO, 1997) argued that quality of life is related to one's health. Balance in occupational engagement leads to attainment of personal goals (Wilcock 1993, 1998b; Wilcock et al., 1997; Christiansen & Matuska, 2006), which are measured as subjective quality of life (WHO, 1997).

The second assumption was that the definitions for and measures of occupational balance and subjective quality of life used in the current study reflected the viewpoints of occupational therapists. Rogers (1984) argued that traditional occupational therapists believed that healthy living was a result of balance in the occupations of "self care, play, work, and rest" (p. 47). In 1986, Marino-Schorn expanded Rogers' definition as equally distributed amounts of time in work, rest, and leisure occupations. The definitions of occupational balance support the definition used for the current study, which is equal distribution of time between work, rest and sleep, and leisure occupations.

Occupational therapists Chan, Krupa, Lawson, and Eastabrook (2005) defined quality of life generally:

> a complex interaction between multiple dimensions including the illness experience... an individual's state of physical, psychological, and social well-being... satisfaction with life activities and relations and opportunities for autonomy... and consistency between personal perceptions of the consistency between goals, hopes, and current situations (p.181).

The PGWBI measures an individual's perceived levels of anxiety, depressed mood, positive well-being, self-control, general health, and vitality. The domains of the PGWBI are consistent with the definition provided by Chan et al. (2005).

The third assumption was that shift workers who had decreased health, social difficulties, and cognitive difficulties would be concerned with those difficulties and appreciate treatment and solutions. Wilcock (1993) promoted the idea that humans are driven to thrive and succeed in life; they innately seek to meet their biological needs such as "sustenance, self care, [and] shelter and safety" (p. 20). No studies were found that investigated the concern for health and well-being among shift workers. It was assumed that if the individuals are unable to meet their biological needs, they would be driven to find and accept a solution, placing value on a preliminary study about occupational balance, subjective quality of life, and shift work.

The final assumption was that shift work is a permanent type of work scheduling in the United States; there would always be people who worked an alternative shift. Some shift workers have expressed that they work alternative shifts for reasons outside of their control (United States Bureau of Labor Statistics, 2005). Rather than ignore the shift worker population or encourage those individuals to work standard shifts, coping strategies for complications caused by shift work should be developed and utilized. In order to suggest effective coping strategies for complications caused by shift work, investigations of the theorized influential variables for ill-health among shift workers must be performed.

Subjects and Selection Methods

A convenience sample of full time employees at an auto parts manufacturing plant were invited to complete and return a packet including three survey instruments. Inclusion criteria included individuals who were over the age of 18 years who could read and understand English versions of the surveys.

Contact via phone, email, and standard mail was made with ten 24-hour industrial companies in central New York state in order to introduce the research study and request permission to recruit employees for the study. The researcher met with the heads of Human Resources for two of the 10 companies. One auto parts manufacturer gave permission and administrative support for recruiting employees for the study.

The researcher presented the opportunity to participate in the study at 21 shift overlap meetings at the auto parts manufacturing plant over a 2-week period. At the shift overlap meetings, the researcher read a prepared statement (see Appendix A) and provided contact information for the research assistant. Interested candidates contacted the research assistant and indicated if they preferred electronic or paper versions of the surveys. The research assistant emailed those who were interested in electronic versions of the surveys a participant number (which was based on the order in which the participant contacted the research assistant) and the url links to the website. The research assistant mailed survey packets to the candidates who were interested in completing paper versions of the surveys.

After receiving a low response rate, the researcher provided the managers at the manufacturing company a statement for second contact (see Appendix B), which they read to their employees. Six hundred packets were delivered to the company, which the managers distributed to interested employees when they read the statement for second contact. The survey packets were identified with numbers (which became the participant number upon receipt of the completed survey packet). The online versions of the surveys remained active for three months.

Operationalization of Concepts into Research Variables

Several variables were operationally defined for the purposes of the current study. Occupational balance and subjective quality of life were the primary dependent variables. Many viewpoints exist for what constitutes occupational balance (Christiansen, 1996; Christiansen & Matuska, 2006; Marino-Schorn, 1986; Rogers, 1984; Wilcock, 1993, 1998b; Wilcock et al., 1997). Marino-Schorn (1986) defined occupational balance as equally distributed amounts of time in work, rest, and leisure occupations. The 24-hour day divided equally among three domains (work, rest and sleep, and leisure) amounts to 8 hours devoted to each domain. It is unrealistic to assume that a person can devote exactly 8 hours to each domain every day, so occupational balance was defined as 8 hours plus or minus 2 hours (6 to 10 hours) for each domain in a given 24-hour time period. Individuals who did not meet the requirements for occupational balance were identified as having occupational imbalance.

Subjective quality of life has been defined as an individual's self-perceived well-being and life satisfaction (Bowling, 1991). Dr. Harold J. Dupuy developed the 22-item questionnaire known as the Psychological General Well-Being Index (PGWBI) in order to "provid[e] an index that could be used to measure self-representations of intrapersonal affective or emotional states reflecting a sense of subjective well-being" (Dupuy, 1984, p. 170). The PGWBI has been classified as a health-related quality of life measure (Chassany et al., 2004). For the purposes of this study, the individual scores of the six subdomains of the PGWBI (anxiety, depressed mood, positive well-being, self-control, general health, and vitality) and the total index score were used to measure *subjective quality of life*.

Secondary dependent variables included: life balance, health status, cognitive difficulties, social difficulties, and lifestyle choices. Christiansen and Matuska (2006) described life balance (previously termed "lifestyle balance") generally as "a consistent pattern of occupations that results in reduced stress and improved health and well-being" (p. 50). On the other hand, lifestyle imbalance was defined as:

> one [lifestyle] where important needs are not being met, where there are either too many or too few role demands, where time is inadequately used for meeting daily occupational demands, and where daily occupations are not meaningful, productive, restorative, or pleasurable (Christiansen & Matuska, 2006, p. 56).

Christiansen and Matuska (2006) explained that individuals experience lifestyle imbalance as "a difficulty in meeting the demands of modern life because of perceived or actual time constraints" (p. 56), which limit the individual's ability to meet his or her personal and social needs satisfactorily. Life balance is a congruency between desired and actual occupational engagement. Using the time diary, participants were asked, "are you satisfied with the amount of time you devote to work, rest/ sleep, and leisure-related activities?" Individuals who answered "yes" to the above question were identified as having life balance while individuals who responded "no" were identified as not having life balance.

Findings from the literature review were used to define health status, cognitive difficulties, social difficulties, and lifestyle choices. Health status was measured by the presence or absence of specified health conditions: cardiovascular (heart) problems, hypertension, diabetes, digestive problems, weight problems, mental health diagnosis, and cancer. The findings of Rajaratnam and Arendt (2001) and Culpepper (2010) were

used to define cognitive difficulties which included: trouble sleeping, excessive sleepiness during awake hours, slow reaction time, impaired memory, trouble with concentration, and low level of motivation and self-initiation. Participants rated their level of cognitive difficulties on a 4-point Likert scale. One social difficulty was identified in the literature (Bianchi & Milkie, 2010; Costa, 1996, 2003; Harrington, 2001), which was trouble fulfilling obligations to family and society. Participants rated their level of difficulty fulfilling obligations on a 4-point Likert Scale. Lifestyle choices included the presence or absence of smoking, alcohol consumption, supplement use (physician prescribed and over-the-counter), and the quality of food consumed while at work. The specified lifestyle choices were based on the findings of Kivimaki et al. (2001), Harrington (2001), and Biggi et al. (2008).

Work shift was the independent variable used in the study. Participants recorded their work shift as either first, second, or third shift. Individuals who worked either first or second shift were categorized as day shift workers. Individuals who worked third shift were categorized as night shift workers.

Measurement Instruments

In this survey design study, each of the participants received a packet comprised of three instruments from which descriptive and correlational data was collected: (a) researcher-developed demographic sheet, (b) researcher-developed time diary, and (c) Dupuy's *Psychological General Well-being Index* (PGWBI) published in 1984. After attaining permission from MAPI Research Institute to transcribe the PGWBI as an electronic version (see Appendix C), electronic and printed versions were made available

for the three surveys. The electronic versions were available through the online survey program Survey Monkey. The complete survey packet is included in Appendices D-I.

A field test was completed in which shift workers from a company not used in the study completed the survey packets and provided feedback on the difficulty, time requirements, and preference of paper or electronic versions of the surveys (see Appendix I). In general, the field test participants found the surveys easy to complete, were able to complete them in less than 10 minutes per day, and preferred paper versions of the surveys. Minor modifications were made to the demographic sheet and time diary given the feedback from the participants in the field test.

Demographic Sheet. The researcher developed the demographic sheet for the purposes of gathering basic information regarding the characteristics of the participants and measuring the variables of health status, cognitive difficulties, social difficulties, and lifestyle choices. The demographic sheet included questions about age, gender, years on shift, average hours worked per week, salary, work setting, and if the work shift was permanent or rotating. The pre-selected adverse health conditions and lifestyle choices were based on existing research on the trends between health status, lifestyle choices, and shift workers.

Using the demographic sheet, the participants identified their assigned work shift. To determine health status, the participants ticked the box next to each ill-health condition as appropriate. If there was no response, it was assumed the participant did not have the ill-health condition. Participants ticked a box on a 4-point Likert scale (never, sometimes, often, frequently) for each of the listed social and cognitive difficulties. To analyze lifestyle choices, the participants ticked the box next to each activity in which

they participated (e.g. smoking, drinking alcohol, eating junk/ processed food). If there was no response, it was assumed the participant did not engage in the activity. The responses were used for analysis against the time diary and PGWBI in order to investigate correlations between health status, lifestyle choices, occupational balance, and subjective quality of life.

Time Diary. The researcher designed the time diary for the purpose of gathering data on how the participants distributed their time over two weekdays and one weekend day. The participants recorded their daily activities at 15-minute increments. The participants categorized each activity as either work-related, rest and sleep-related, or leisure-related. Definitions of work, rest and sleep, and leisure activities were provided on the time diary as a reference for the participants.

Work-related activities were activities that one was obligated to do in order to sustain life, care for self and others, or fulfill responsibilities. Rest and sleep-related activities were quiet and effortless activities that enabled the mind and body to relax (Nurit & Michel, 2003, p. 27). Leisure-related activities were desired activities that occurred during discretionary time and were chosen because a person had interest and motivation to engage in the activities.

Occupational balance was determined by the average hours spent engaged in each of the three activity domains (work, rest and sleep, leisure) over the three-day period. If the participant averaged 6-10 hours engaged in each of the three activity domains, he or she was identified as having occupational balance. Satisfaction with the distribution of work, rest and sleep, and leisure activities for the day was also recorded in order to explore the level of congruency between desired and actual occupational participation, an

alternative perspective for occupational balance (Matuska & Christiansen, 2008). Individuals who responded "yes" to the question, "are you satisfied with the amount of time you devote to work, rest and sleep, and leisure activities" were categorized as having life balance.

Keilhofner (2008) theorized that the establishment of routines is important for a sense of well-being. Questions on the time diary such as where the activity took place and with whom the activity was completed (i.e. alone, family, friend, coworker) were used to investigate the presence of routines. The time diary was used to measure two sleep habits: number of total hours of sleep per day and number of sleep intervals (napping) per day. The researcher tallied the total number of hours of sleep and the number of sleep intervals for each day for each participant and averaged the variables from the number of days for which the time diary was completed. In order to consider the validity of the responses for the day about which the participant recorded his or her activities, the participant indicated if the day was representative of a typical day.

Psychological General Well-being Index. Subjective quality of life was based on the participants' scores on the PGWBI. The PGWBI is a self-administered questionnaire comprised of 22 questions. The participants were instructed to complete the questionnaire given their feelings over the past month. Each of the subdomains contains three to five questions: Anxiety (five questions), Depressed Mood (three questions), Positive Well-Being (four questions), Self-Control (three questions), General Health (three questions), and Vitality (four questions). Each question was answered using a Likert scale response ranging from 0-5 that related to the frequency and/or intensity of the answer. Raw scores were calculated for each subdomain and the total score which

ranged from 0-110. The raw scores were then converted to a percentage of 0-100 for each subdomain. Categorical scores were based on the raw scores of the total score including 0-60 *severely distressed*, 61-72 *moderately distressed*, and 73-110 *positive well-being.*

The PGWBI is a tool that has a long history of development and use. The PGWBI was originally titled the General Well-Being Schedule (GWB) and consisted of 18-items (Chassany et al., 2004). Fourteen items were ranked from 0-5 and four items were ranked from 0-10, giving a total score of 128. The 18-questions were divided among six subdomains including anxiety, depressed mood, positive well-being, self-control, general health, and vitality. The original GWB was used as one of several assessments included in the United States National Health Examination Survey of 6,913 patients at mobile health clinics between the years of 1971 and 1975 (Chassany et al., 2004).

In order to meet the requirements of inclusion in the draft version of the Rand Mental Health Inventory (McDowell, 2006), Dupuy modified the GWB from an 18-item questionnaire to a 22-item questionnaire (Chassany et al., 2004). Dupuy maintained the original six subdomains but changed the question structure so that there was more consistency throughout the questionnaire. Four questions that were ranked 0-10 were split into eight questions ranked 0-5 so that all the questions in the questionnaire were ranked 0-5 (Chassany et al., 2004). The modified 22-item questionnaire was renamed to its current title, *Psychological General Well-Being Index* (Dupuy, 1984).

Since its conception as the GWB and subsequently modified PGWBI format, the questionnaire has been used in at least 160 studies and translated into 36 languages (Chassany et al., 2004). Clinical applications of the PGWBI include efficacy of treatment

regimes, investigation of how conditions influence the well-being of patients, and population surveys (Chassany et al., 2004; Dupuy, 1984; McDowell, 2006).

In 2001, MAPI Research Institute developed a database titled the International Health-related Quality of Life Outcomes Database (IQOD), which contains three health-related quality of life assessments and the research articles in which they are referenced. The database provides normed data for a number of variables for each of the assessments, and is continually updated as new literature emerges. The PGWBI is one of the three measures included in the database. MAPI Research Institute reported its selection criteria for the measures: "their original validation studies and/or the rigorous methodology used for their translations gave especially favourable results, and because they represent different types of questionnaire: population specific, generic and disease specific" (Chassany et al., 2004, p. 8).

A number of researchers have assessed the reliability and validity of the PGWBI (Dupuy, 1984). Five studies have tested the questionnaire's internal consistency, in which the alpha coefficients ranged from .901 to .940 with a mean of .918 (Dupuy, 1984). Five studies investigated the PGWBI's test-retest reliability, which ranged from .502 to .861 with a median of .66 (Dupuy, 1984). Concurrent validity has been assessed between the PGWBI and 14 mental health scales, which ranged from .52 to .80 (Dupuy, 1984). Concurrent validity (.74) was also established between the PGWBI and the Affectometer (Dupuy, 1984). Discriminate validity has been assessed for the PGWBI and its use among two samples of general community members and two samples of community mental health clients with scores of .565, .667, and .634 (Dupuy, 1984).

The PGWBI was selected for this study because it best exemplifies *subjective* well-being or quality of life. The PGWBI was used in conjunction with the time diary to investigate how occupational imbalance influences the subjective quality of life of the participants. The PGWBI was also used in conjunction with the demographic sheet in order to investigate how certain health conditions and cognitive and social difficulties influence the subjective quality of life of the participants. Finally, the PGWBI was used independently to explore the general subjective quality of life of the participants, a sample of shift workers, to determine if there is a statistically significant difference between day and night shift workers.

Data Gathering, Analyzing, and Interpreting Data

Data was gathered from completed survey packets. Participants who completed the paper versions of the surveys returned the survey packets through the mail. Participants who completed the electronic versions of the surveys submitted their responses through the online program, Survey Monkey. Responses were transcribed and coded using Microsoft Excel. All survey results remained anonymous.

The statistical software program, Predictive Analytics Software (PASW) version 18, was used to analyze the data. The variables used in the study included work shift, occupational balance, subjective quality of life, health status, cognitive and social difficulties, lifestyle choices, sleep habits, and life balance. Statistics used within the study included frequency statistics, descriptive statistics, Chi-square, Pearson correlation coefficient, and Spearman's rho correlation coefficient.

Chi-square statistics were used to analyze categorical data, which included occupational balance, work shift, categorical scores for the PGWBI, the ill-health

conditions that determined health status, lifestyle choices, and life balance. Pearson correlation coefficients were used to analyze interval data, which included total hours engaged in each of the subcomponents of occupational balance (work, rest and sleep, leisure), raw and converted scores for the PGWBI, total number of hours of sleep per day, and number of intervals of sleep per day. Spearman's rho was used to analyze ordinal data, which included the cognitive and social difficulties.

Scope and Limitations

The scope of the study was limited to full time shift workers employed at the auto parts manufacturing plant. Within the sample of participants, gender and age were equally represented to a sufficient degree. The majority of the participants were production line workers when compared to their office-working counterparts, limiting the generalizability of results beyond the individuals who worked on the production line.

Collectively, the demographic sheet, time diary, and PGWBI were used to answer the primary and secondary research questions including the relationships between work shift, occupational balance, subjective quality of life, health status, cognitive and social difficulties, and lifestyle choices. Measures were taken to ensure anonymity and confidentiality among the convenience sample of 21 employees at a local auto parts manufacturing plant. Continued in chapter 4 is a report of the results found in the study, in relation to the research questions.

Chapter Four: Results

A three-day time diary, subjective quality of life questionnaire, and demographic sheet were used to answer the research questions. The time diary was used to determine if there was a statistically significant difference between day and night shift workers for the prevalence of occupational balance. The Psychological General Well-being Index (PGWBI) was used to determine if there was a statistically significant relationship between subjective quality of life and work shift. The demographic sheet was used to determine if there were statistically significant differences between day and night shift workers in relation to health status and lifestyle choices. The demographic sheet was also used to determine if there were statistically significant relationships of cognitive difficulties and social difficulties with work shift. A post hoc analysis was completed in order to compare the definition for *occupational balance* that was used in the study against an alternative definition, *life balance*. The criteria for occupational balance and life balance were compared using the strength of their correlations with subjective quality of life and the difference of means for the different work shifts.

Participant Characteristics

Twenty-one employees participated in the study including 16 participants who returned completed survey packets and 5 participants who returned partially completed survey packets. Three participants (14.3%) reported working on "1st shift," 11 (52.4%) on "2nd shift," and 7 (33.3%) on "3rd shift." All participants worked a permanent, non-rotating shift. The age of the participants ranged from 22 years to 62 years. Of the 21 participants, 10 (47.6%) identified as "female," 9 (42.9%) identified as "male," and 2 (9.5%) did not specify a gender. The median number of years that the participants had

been working on their current work shift was 5-9 years. The median number of hours worked per week was 40-44 hours. The majority of the participants worked on a production line (82.4%) and earned between $15.01 and $20 per hour (90%). A more detailed list of the participant demographics is presented in Table 1.

Table 1

Participant Demographics

Variable	*n*	Percentage
Years On Shift		
0-4 years	9	47.4%
5-9 years	1	5.3%
10-14 years	5	26.3%
15-19 years	4	21.1%
No response	2	Not included in the total
Average Hours Worked Per Week		
40-44 hours	9	52.9%
45-49 hours	3	17.6%
50-54 hours	4	23.5%
55-59 hours	0	0%
60+ hours	1	5.9%
No response	4	Not included in the total
Work Environments		
Office	3	17.6%
Cubical	0	0%
Production line	14	82.4%
No response	4	Not included in the total
Salary Per Hour		
$15.01 - $20.00	18	90%
$20.01+	2	10%
No response	1	Not included in the total

Note. n= 21. Percentages are based on the total number of responses for each variable.

Occupational Balance and Work Shift

To answer the question "is there a significant difference between day and night shift workers for the prevalence of occupational balance," data from the time diaries was used to determine if the participants had occupational balance or occupational imbalance. Thirty-three percent ($n = 4$) of day shift workers and 16.7% ($n = 1$) of night shift workers met the criteria for having occupational balance (OB) signifying the majority had occupational imbalance. Among the 19 participants who completed the demographic sheet, a chi-square test was performed to examine if there was a significant difference between day and night shift workers for occupational balance; no statistical significance was found, $\chi^2(1) = .554$, $p = .457$. Mean number of hours and standard deviations of the subcomponents of OB (work, rest and sleep, leisure) are presented in Table 2. Day shift workers worked 39% of the day while night shift workers worked 40% of the day. Rest and sleep accounted for the next largest portion of the day for both groups. Day shift workers spent 33% of the day resting and sleeping and night shift workers spent 38% of the day resting and sleeping. Leisure activities accounted for the least amount of time with day shift workers spending 26% of the day and night shift workers spending 20% of the day engaged in leisure occupations.

Table 2

Mean Hours and Standard Deviations of Subcomponents of Occupational Balance and Work Shift

	Day Shift (n=13)		Night Shift (n=6)		Total (n=19)	
Subcomponents	*M*	*SD*	*M*	*SD*	*M*	*SD*
Work	9.31	2.88	9.51	2.66	9.37	2.74
Rest and Sleep	7.81	1.65	9.00	3.40	8.18	2.31
Leisure	6.20	2.77	4.78	2.97	5.75	2.83

Note. Day shift workers included individuals who worked 1st and 2nd shifts. Night shift workers included individuals who worked 3rd shift. Occupational balance was defined as 6-10 hours in each of the subcomponents of occupational balance (work, rest and sleep, and leisure).

Subjective Quality of Life and Work Shift

To answer the question "is there a significant relationship between work shift and subjective quality of life," scores from the Psychological General Well-being Index (PGWBI) were used to determine the level of subjective quality of life for each of the participants. There was a statistically significant inverse relationship between work shift and the global PGWBI score (r = -.579, p = .008). There were statistically significant inverse relationships between work shift and 4 of the 6 subdomains of the PGWBI including anxiety (r = -.541, p = .014), self-control (r = -.469, p = .037), general health (r = -.466, p = .038), and vitality (r = -.619, p = .004). Correlations were approaching statistical significance for the relationships between work shift and 2 subdomains of the PGWBI including depressed mood (r = -.424, p = .062) and positive well-being

($r = -.407$, $p = .075$). Mean scores and standard deviations are listed in Table 3. There was a lower mean score for each of the subcomponents of the PGWBI among the night shift workers.

Table 3

Mean Scores and Standard Deviations of the Subdomains and Global Scores of the PGWBI

	Day Shift ($n = 13$)		Night Shift ($n = 7$)		Total ($n = 20$)	
Subdomains	*M*	*SD*	*M*	*SD*	*M*	*SD*
Anxiety[a]	70	12.71	47	24.49	62	20.29
Depressed Mood[b]	86	8.19	67	33.19	79	21.80
Positive Well-being[c]	62	14.35	46	23.35	56	19.03
Self-Control[d]	88	16.43	66	27.77	80	23.03
General Health[e]	65	15.64	48	18.25	59	18.22
Vitality[f]	65	14.79	36	23.04	55	22.30
Global[g]	71	9.92	50	21.65	64	17.78

Note. [a-g] Based on converted scores of 0-100.

Dupuy assigned categorical descriptors to the global score based on the original 0-110 rating system (Chassany et al., 2004). A score of 0-60 was categorized as severely distressed, 61-72 moderately distressed, and 73-110 positive well-being. The mean global scores for the day and night shift based on the 0-110 rating system were 78 and 55 respectively. Of the day shift workers, 23% ($n = 3$) scored severely distressed, 15% ($n = 2$) scored moderately distressed, and 62% ($n = 8$) scored with positive well-being. Of the night shift workers, all participants scored either severely distressed ($n = 4$; 57%) or moderately distressed ($n = 3$; 43%). There was a statistically significant inverse

relationship between the categorical scores of the PGWBI and work shift (r = -.527, p = .017) in that people who worked the night shift had lower total scores for the PGWBI.

Health Status and Work Shift

To answer the question "is there a statistically significant difference between day and night shift workers for the prevalence of ill-health conditions," participant responses to the presence or absence of medical conditions that were listed on the demographic sheet were analyzed. It was hypothesized that night shift workers would have a higher prevalence of the ill-health conditions listed. Table 4 outlines the presence of various diagnoses among the total population as well as results from chi-square tests used to analyze the difference of means between day and night shift workers for each of the diagnoses. No statistically significant differences were found between day and night shift workers for any of the diagnoses. Two categories, mental health diagnosis and cancer, were not reported by participants in either shift.

Table 4

Frequency Statistics for Presence of Health-related Diagnoses and Chi-Square Tests Between Work Shift and Diagnoses

Diagnoses	Day Shift ($n = 13$)	Night Shift ($n = 7$)	χ^2
Cardiovascular Problems	1 Yes 12 No	0 Yes 7 No	$\chi^2(1) = 5.67, p = .452$
Hypertension	3 Yes 10 No	0 Yes 7 No	$\chi^2(1) = 1.90, p = .168$
Diabetes	3 Yes 10 No	1 Yes 6 No	$\chi^2(1) = .220, p = .639$
Digestive Problems	3 Yes 10 No	2 Yes 5 No	$\chi^2(1) = .073, p = .787$
Weight Problems	6 Yes 7 No	4 Yes 3 No	$\chi^2(1) = .220, p = .639$
Mental Health Diagnosis	0 Yes 13 No	0 Yes 7 No	*N/A*
Cancer	0 Yes 13 No	0 Yes 7 No	*N/A*

Note. Prevalence of diagnoses was based on the participant ticking the box next to each diagnosis on the demographic sheet. No response indicated that the participants did not have the condition. 14 cells (50%) have expected count less than 5.

Cognitive and Social Difficulties and Work Shift

To answer the question "are there statistically significant relationships of cognitive and social difficulties with work shift," participants reported their level of difficulty on a 4-point Likert scale for several cognitive and social skills. It was hypothesized that night shift workers would experience more difficulty with the cognitive and social skills listed. The presence of cognitive and social difficulties among the total sample as well as Spearman correlation coefficients used to analyze the relationships

between work shift and the identified difficulties are listed in Table 5. There was a statistically significant relationship between work shift and excessive sleepiness during awake hours ($r_s = .593$, $p = .006$). There were no statistically significant relationships between work shift and the other areas of cognitive and social difficulties. The continuum of answers for the areas of cognitive and social difficulties is displayed in Figures 1 through 7.

Table 5

Cross Tabulations and Spearman Correlation Coefficients for Work Shift and Presence of Cognitive and Social Difficulties

	Day Shift ($n = 13$)				Night Shift ($n = 7$)				
Difficulties	N	S	O	F	N	S	O	F	r_s
Excessive Sleepiness During Awake Hours	2	9	2	0	0	2	3	2	.593**
Trouble Sleeping	0	7	4	2	1	1	3	2	.172
Slow Reaction Time	4	9	0	0	1	5	1	0	.272
Impaired Memory	2	8	3	0	1	3	3	0	.162
Trouble with Concentration	4	7	2	0	0	5	2	0	.331
Low Level of Motivation and Self-Initiation	2	10	1	0	1	4	0	2	.214
Trouble Fulfilling Obligations to Family and Society	6	7	0	0	3	1	2	1	.237

Note. The participants ranked the frequency with which with they experienced each of the cognitive and social difficulties: Never (N); Sometimes (S); Often (O); Frequently (F).

** $p < .01$ (2-tailed)

Figure 1. Excessive Sleepiness During Awake Hours and Work Shift

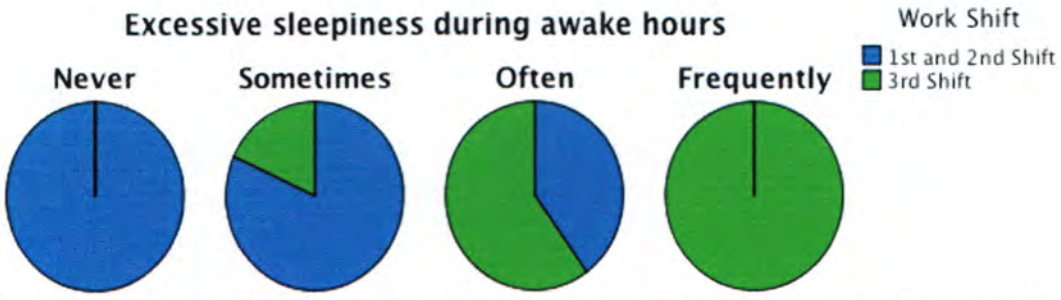


Figure 1. Graphic display of excessive sleepiness during awake hours among day and night shift workers.

Figure 2. Trouble Sleeping and Work Shift

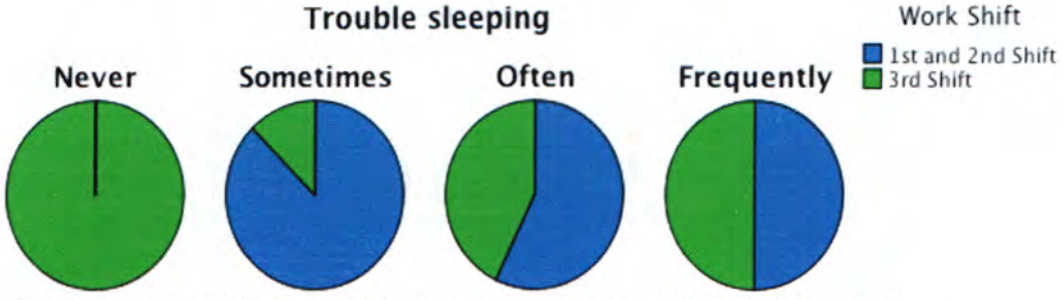


Figure 2. Graphic display of trouble sleeping among day and night shift workers.

Figure 3. Slow Reaction Time and Work Shift

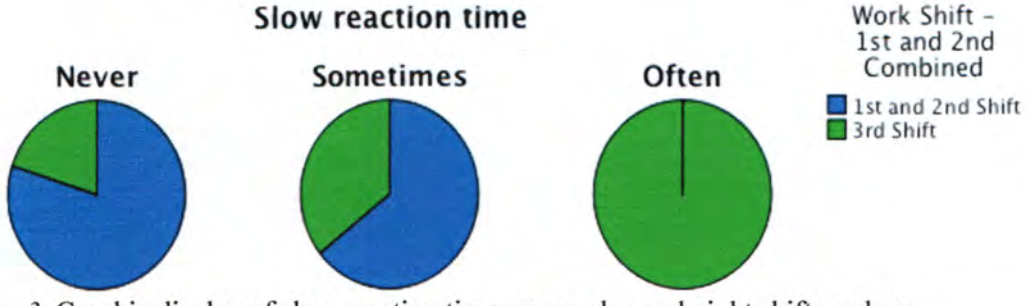


Figure 3. Graphic display of slow reaction time among day and night shift workers.

Figure 4. Impaired Memory and Work Shift

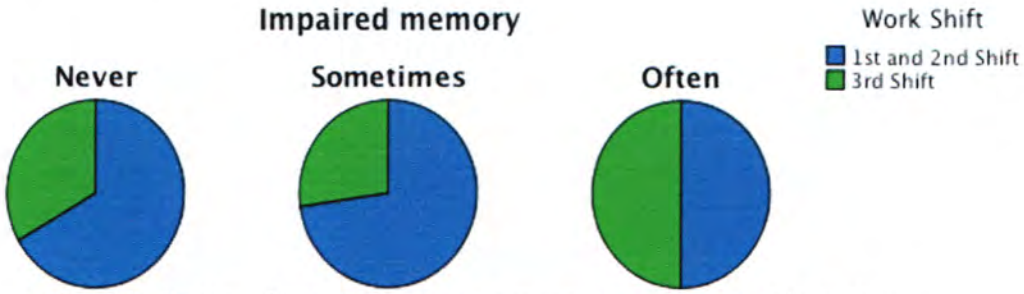


Figure 4. Graphic display of impaired memory among day and night shift workers.

Figure 5. Trouble with Concentration and Work Shift

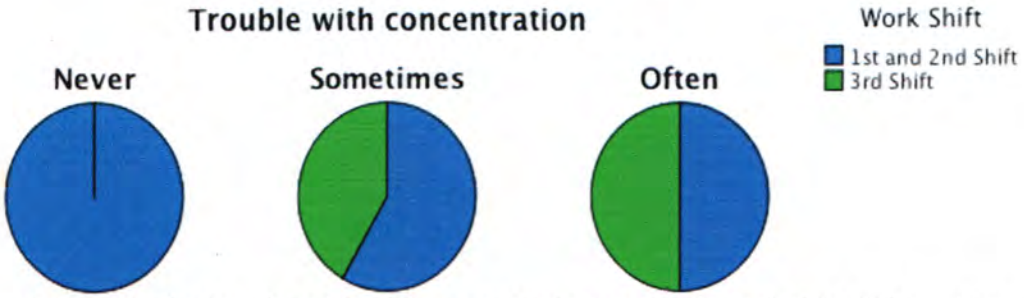


Figure 5. Graphic display of trouble with concentration among day and night shift workers.

Figure 6. Low Level of Motivation and Self-Initiation and Work Shift

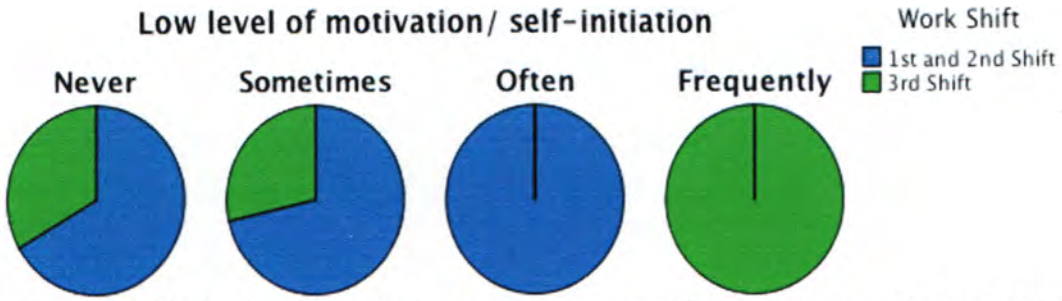


Figure 6. Graphic display of low level of motivation and self-initiation among day and night shift workers.

Figure 7. Trouble Fulfilling Obligations to Family and Society and Work Shift

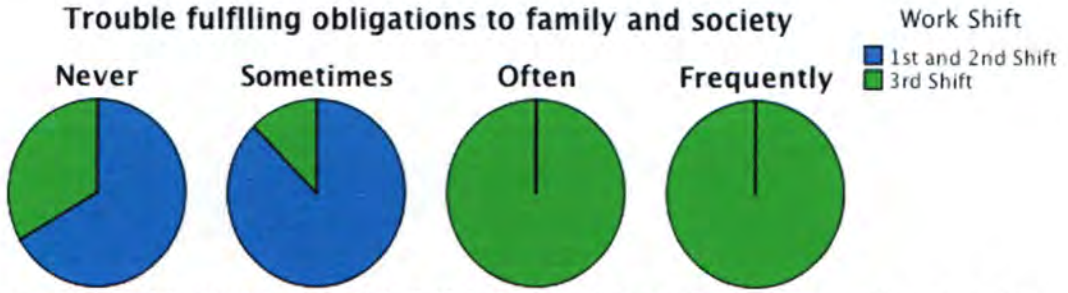


Figure 7. Graphic display of trouble fulfilling obligations to family and society among day and night shift workers.

Lifestyle Choices and Work Shift

To answer the question "is there a statistically significant difference between day and night shift workers for the types of lifestyle choices," participants reported the presence or absence of certain activities listed on the demographic sheet. It was hypothesized that night shift workers would be more likely to engage in smoking, drinking alcohol, taking supplements (prescribed by a physician and self-prescribed), eating junk food while at work, and eating vending machine food while at work. Chi-square tests were used to analyze the difference of means between day and night shift workers for each of the lifestyle choices (see Table 6), for which no statistically significant differences were found.

Table 6

Frequency Statistics for Lifestyle Choices and Chi-Square Tests Between Work Shift and Lifestyle Choices

Lifestyle Choices	Day Shift ($n = 13$)	Night Shift ($n = 7$)	χ^2
Smoking	3 Yes 10 No	2 Yes 5 No	$\chi^2(1) = .073, p = .787$
Drinking Alcohol	7 Yes 6 No	2 Yes 5 No	$\chi^2(1) = 1.174, p = .279$
Taking Supplements Prescribed by a Physician	3 Yes 10 No	3 Yes 4 No	$\chi^2(1) = .848, p = .357$
Taking Over-The-Counter, Self-Prescribed Supplements	4 Yes 9 No	4 Yes 3 No	$\chi^2(1) = 1.319, p = .251$
Eating Junk Food While At Work	0 Yes 13 No	1 Yes 6 No	$\chi^2(1) = 1.955, p = .162$
Eating Vending Machine Food While At Work	4 Yes 9 No	0 Yes 7 No	$\chi^2(1) = 2.692, p = .101$
Eating Fresh Fruit and Vegetables While At Work	7 Yes 6 No	5 Yes 2 No	$\chi^2(1) = .586, p = .444$
Eating Other Food From Home While At Work	12 Yes 1 No	6 Yes 1 No	$\chi^2(1) = .220, p = .639$

Note. Prevalence of lifestyle choices was based on the participant ticking the box next to each activity on the demographic sheet. No response indicated that the participants did not engage in that activity. 16 cells (50%) have expected count less than 5.

Occupational Balance and Health

It was hypothesized that individuals with occupational imbalance would have a higher prevalence of ill-health conditions. Health-related variables within this study included the general health and vitality scores from the PGWBI as well as diagnoses listed on the demographic sheet. Pearson correlation coefficients were used to analyze the

relationships between occupational balance and the scores for general health ($r = .230$, $p = .360$) and vitality ($r = -.144$, $p = .569$) for which no statistically significant relationships were found. Chi-square tests were used to analyze the difference of means between individuals with occupational balance and individuals with occupational imbalance for each of the diagnoses listed on the demographic sheet, for which no statistically significant differences were found. Results are presented in Table 7.

Table 7

Frequency Statistics and Chi-Square Tests for Health-related Variables Between Individuals with Occupational Balance and Occupational Imbalance

Variables	Occupational Balance ($n = 5$)	Occupational Imbalance ($n = 13$)	χ^2
Cardiovascular Problems	0 Yes 5 No	0 Yes 13 No	N/A
Hypertension	1 Yes 4 No	2 Yes 11 No	$\chi^2(1) = .055, p = .814$
Diabetes	1 Yes 4 No	2 Yes 11 No	$\chi^2(1) = .055, p = .814$
Digestive Problems	0 Yes 5 No	4 Yes 9 No	$\chi^2(1) = 1.978, p = .160$
Weight Problems	1 Yes 4 No	8 Yes 5 No	$\chi^2(1) = 2.492, p = .114$
Mental Health Diagnosis	0 Yes 5 No	0 Yes 13 No	N/A
Cancer	0 Yes 5 No	0 Yes 13 No	N/A

Note. Prevalence of health conditions was based on the participant ticking the box next to each health condition on the demographic sheet. No response indicated that the participants were not diagnosed with the health condition. 16 cells (57%) have expected count less than 5.

Occupational Balance and Cognitive and Social Difficulties

It was hypothesized that individuals with occupational imbalance would have a higher prevalence and intensity of cognitive and social difficulties. Spearman correlation coefficients were used to analyze the relationships of cognitive and social difficulties with occupational balance. Results are presented in Table 8. There were no statistically significant relationships between occupational balance and variables for cognitive and social difficulties, with the exception of excessive sleepiness during awake hours ($r_s = .593, p = .006$).

Table 8

Cross Tabulations and Spearman Correlation Coefficients for Occupational Balance and Presence of Cognitive and Social Difficulties

	Occupational Balance ($n = 5$)				Occupational Imbalance ($n = 13$)				
Difficulties	N	S	O	F	N	S	O	F	r_s
Excessive Sleepiness During Awake Hours	1	4	0	0	1	6	4	2	.593**
Trouble Sleeping	1	1	3	0	0	7	3	3	.174
Slow Reaction Time	2	3	0	0	3	9	1	0	.272
Impaired Memory	1	4	0	0	2	6	5	0	.162
Trouble with Concentration	2	3	0	0	2	7	4	0	.331
Low Level of Motivation and Self-Initiation	2	2	1	0	1	10	0	2	.214
Trouble Fulfilling Obligations to Family and Society	2	3	0	0	6	4	2	1	.237

Note. The participants ranked the frequency with which with they experienced each of the cognitive and social difficulties: Never (N); Sometimes (S); Often (O); Frequently (F). Data from the time diary determined the presence of occupational balance or imbalance based on relatively equal or unequal hours dedicated to each category.
** $p < .01$ (two-tailed)

Health Status and Subjective Quality of Life

It was hypothesized that there would be a statistically significant difference between the three subjective quality of life (SQOL) categorical scores for the health-related variables. Chi-square tests were run to analyze the difference of means between the SQOL categorical scores for each of the health-related variables listed on the demographic sheet. The categorical descriptors were taken from the PGWBI and included

severe distress, moderate distress, and positive well-being. Global and vitality scores were not included in the list of health-related variables for the chi-square tests in this section because the dependent variable, categorical scores, was taken from the same outcome measure as the global and vitality scores. The results are presented in Table 9. There were no statistically significant differences between the three categorical scores from the PGWBI for any of the health-related variables.

Table 9

Cross Tabulations and Chi-Square Tests for Health-related Variables and Subjective Quality of Life

Diagnoses	Severe Distress ($n = 7$)	Moderate Distress ($n = 5$)	Positive Well-being ($n = 8$)	χ^2
Cardiovascular Problems	0 Yes 7 No	0 Yes 5 No	1 Yes 7 No	χ^2 (2) = 1.579, p = .454
Hypertension	0 Yes 7 No	2 Yes 3 No	1 Yes 7 No	χ^2 (2) = 3.725, p = .155
Diabetes	2 Yes 5 No	1 Yes 4 No	1 Yes 7 No	χ^2 (2) = .603, p = .740
Digestive Problems	3 Yes 4 No	0 Yes 5 No	2 Yes 6 No	χ^2 (2) = 2.857, p = .240
Weight Problems	5 Yes 2 No	2 Yes 3 No	3 Yes 5 No	χ^2 (2) = 1.986 , p = .371
Mental Health Diagnosis	0 Yes 7 No	0 Yes 5 No	0 Yes 8 No	N/A
Cancer	0 Yes 7 No	0 Yes 5 No	0 Yes 8 No	N/A

Note. Severe distress warranted a raw global score of 0-60, moderate distress 61-72, and positive well-being 73-110 on the PGWBI. Prevalence of diagnoses was based on the participant ticking the box next to each diagnosis on the demographic sheet. No response indicated that the participants did not have the condition. 25 cells (60%) have expected count less than 5.

Cognitive and Social Difficulties and Subjective Quality of Life

It was hypothesized that there would be statistically significant inverse relationships of cognitive and social difficulties with the PGWBI scores. Spearman correlation coefficients were used to analyze relationships between cognitive and social difficulties with variables for SQOL. Results are presented in Table 10. There were statistically significant inverse relationships between SQOL and excessive sleepiness during awake hours (r_s = -.704, p = .001), trouble sleeping (r_s = -.547, p = .013), trouble with concentration (r_s = -.731, p = .000), low level of motivation and self-initiation (r_s = -.522, p = .018), and trouble fulfilling obligations to family and society (r_s = -.698, p = .001). The relationship between SQOL and slow reaction time approached statistical significance. (r_s = -.420, p = .065). There was not a statistically significant relationship between SQOL and impaired memory.

Table 10

Cross Tabulations and Spearman Correlation Coefficients for Cognitive and Social Difficulties and Subjective Quality of Life

	Severe Distress ($n = 7$)				Moderate Distress ($n = 5$)				Positive Well-being ($n = 8$)				
Difficulties	N	S	O	F	N	S	O	F	N	S	O	F	r_s
Excessive Sleepiness During Awake Hours	0	1	4	2	1	3	1	0	1	7	0	0	-.704**
Trouble Sleeping	0	1	3	3	1	1	2	1	0	6	2	0	-.547*
Slow Reaction Time	0	6	1	0	2	3	0	0	3	5	0	0	-.420
Impaired Memory	0	4	3	0	1	2	2	0	2	5	1	0	-.364
Trouble with Concentration	0	3	4	0	0	5	0	0	4	4	0	0	-.731**
Low Level of Motivation and Self-Initiation	0	4	1	2	1	4	0	0	2	6	0	0	-.522*
Trouble Fulfilling Obligations to Family and Society	0	4	2	1	3	2	0	0	6	2	0	0	-.968**

Note. Severe distress warranted a raw global score of 0-60, moderate distress 61-72, and positive well-being 73-110 on the PGWBI. The participants ranked the frequency with which with they experienced each of the cognitive and social difficulties: Never (N); Sometimes (S); Often (O); Frequently (F). Data from the time diary was used to determine the presence of occupational balance or imbalance based on relatively equal or unequal hours dedicated to each category.
*$p < .05$ (2-tailed); ** $p < .01$ (2-tailed)

Post Hoc Analysis

Sleeping Habits. A post hoc analysis was performed to investigate relationships between sleeping habits and all other variables in the study. The two variables for

sleeping habits included in the post hoc analysis were average hours of sleep per day and number of sleep intervals (napping). Positive relationships with statistical significance were found between increased hours of sleep and increased subjective quality of life in the areas of self-control ($r = .471$, $p = .042$), general health ($r = 472$, $p = .041$), vitality ($r = .585$, $p = .009$), and overall subjective quality of life ($r = .452$, $p = .052$). Statistically significant inverse relationships were found between increased intervals of sleep (napping) and decreased subjective quality of life in the areas of anxiety ($r = -.789$, $p = .000$), depressed mood ($r = -.710$, $p = .001$), positive well-being ($r = -.579$, $p = .009$), self-control ($r = -.611$, $p = .005$), general health ($r = -.561$, $p = .012$), vitality ($r = -.605$, $p = .006$), and overall subjective quality of life ($r = -.742$, $p = .000$).

Alternative definition for occupational balance. Approximately 50% ($n = 10$) of the total sample reported satisfaction with the balance between work, rest and sleep, and leisure occupations. Of those who were not satisfied, four participants reported a desire for more rest and sleep, three participants reported a desire for more leisure time, and one participant reported a desire for less work. One participant reported that he or she would like more social participation.

Results comparing Marino-Schorn's (1986) definition of occupational balance and Matuska and Christiansen's (2008) definition of life balance are presented in Table 11. The percentage of participants with occupational balance increased from 26.3% to 52.6% when the life balance definition was applied. Similar to the original analysis between occupational balance and work shift, there was no statistically significant difference between day and night shift workers for prevalence of life balance. In contrast to the analyses between occupational balance and the variables for subjective quality of

life, there were statistically significant relationships between life balance and the categorical descriptors of SQOL (severe distress, moderate distress, positive well-being). There were statistically significant relationships between life balance and the SQOL areas of general health ($r = -.592, p = .008$), vitality ($r = -.741, p = .000$), and overall subjective quality of life ($r = -.568, p = .001$).

Table 11

Descriptive and Correlational Data for Comparing Definitions of Occupational Balance and Life Balance

Variables	Occupational Balance (Marino-Schorn)	Life Balance (Matuska & Christiansen)
Percentage of Total Sample	73% = No 26.3% = Yes	47.4% = No 52.6% = Yes
Work Shift	χ^2 (1) = .554	χ^2 (1) = 1.310
Categorical Descriptors of PGWBI	χ^2 (2) = .744	χ^2 (2) = 7.334*
Anxiety Score	$r = -.273$	$r = -.454$
Depressed Mood Score	$r = -.254$	$r = -.297$
Positive Well-being Score	$r = -.229$	$r = -.417$
Self-Control Score	$r = -.146$	$r = -.446$
General Health Score	$r = 1.71$	$r = -.592$**
Vitality Score	$r = -.194$	$r = -.741$**
Global Score	$r = -.202$	$r = -.568$**

*$p < .05$ (2-tailed)
** $p < .01$ (2-tailed)

All of the primary and secondary research questions were answered using the demographic sheet, time diary, and PGWBI. There were statistically significant differences and relationships between some of the variables, particularly when comparing

subjective quality of life to work shift, cognitive and social difficulties, total hours of sleep, number of sleep intervals, and life balance. There were no statistically significant differences or relationships among other variables, such as when comparing work shift to occupational balance, health status, cognitive and social difficulties, and lifestyle choices.

In summary, there were no statistically significant differences between day and night shift workers in relation to occupational balance, health status, or lifestyle choices. There were no statistically significant relationships between work shift and 6 out of 7 identified cognitive and social difficulties. There was a statistically significant relationship between work shift and subjective quality of life (SQOL) for 4 out of 6 subdomains of SQOL. There was also a statistically significant difference between day and night shift workers for excessive sleepiness during awake hours. Contained in chapter 5 is a discussion of the results including interpretation of data, comparison of results to those found in the literature, and identification of possible influential factors on the results.

Chapter Five: Discussion

Contained in chapter 5 is a discussion of the findings. The primary research questions will be discussed first, followed by the secondary research questions, and finally the post hoc analyses. Chapter 5 will conclude with a discussion about limitations and potential confounding factors in the study.

Primary Research Questions

There were two primary research questions for the study. First, is there a statistically significant difference between day and night shift workers for the prevalence of *occupational balance*? Second, is there a statistically significant relationship between work shift and *subjective quality of life*?

Occupational Balance and Work Shift. Occupational balance was defined as equal distribution of time (6-10 hours) devoted to work, rest and sleep, and leisure occupations, using definitions from Marino-Schorn (1986), Wilcock (1998b), Nurit & Michel (2003), and AOTA (2008). The majority (73%) of the total sample of shift workers did not divide their time equally between work, rest and sleep, and leisure occupations, and were thus identified as having occupational imbalance. An unexpected finding of the current study was that there was no statistically significant difference between day and night shift workers for the prevalence of occupational balance, even though this was consistent with Rosenthal and Howe's (1984) study. One explanation might be the definition that was used for occupational balance, which was based on equal distribution of time among occupations (work, rest and sleep, and leisure). An alternative definition might have yielded different results. Rather than ascribe to the traditional time-based definition of occupational balance, Wilcock (1993) theorized that occupational

balance is based on fulfilling basic human needs including physical, social, mental, and rest needs. It may not be how much time the person spends engaged in a certain type of occupation, but the quality of time engaged and how well the engagement fulfills the person's needs. There was no way to discern quality of engagement in the current study.

Wilcock (1998b) identified shift workers as a population at risk for occupational imbalance and hypothesized that the consequences of shift work included an inability to successfully fulfill one's personal needs. An alternative hypothesis for future research might be that shift workers have a higher prevalence of occupational imbalance in respect to decreased quality of time engaged in occupations and ability to fulfill personal needs as implied by Drake et al. (2004), Harrington (2001), and Schwartz and Roth (2006).

Subjective Quality of Life and Work Shift. There was a statistically significant relationship between work shift and subjective quality of life using the Psychological General Well-Being Index (PGWBI). The subcomponents of the PGWBI included anxiety, depressed mood, positive well-being, self-control, general health, and vitality (Chassany et al., 2004). The global score for the PGWBI was translated into categorical scores including severe distress, moderate distress, and positive well-being (Chassany et al., 2004). On average, the day shift workers scored within the positive well-being category and the night shift workers scored within the severe distress category. In the 1975 Rand Health Examination, 71% of the U.S. population scored with positive well-being, 15.5% with moderate distress, and 13.5% with severe distress (Chassany et al., 2004). The results of the day shift workers in this sample were similar to the national statistics from the Rand Health Examination, while the results from the night shift workers were well below the national statistics.

Studies within the literature showed mixed results in regards to the impact that work shift has on one's quality of life. Lipovcan et al. (2004) measured "quality of life, life satisfaction, and happiness in shift and non-shift workers" (p. 3). The researchers found that there were no statistically significant relationships between total quality of life, happiness, or life satisfaction when comparing night shift workers with day shift and non-shift workers, but age was a factor (Lipovcan et al., 2004). Younger night shift workers had decreased happiness and life satisfaction than older night shift workers while younger day workers were happier and more satisfied than older day workers. It is possible that night shift more negatively affects younger people because of the different circumstances (e.g. family and parental responsibilities) and tolerance for shift work (Lipovcan et al., 2004).

Paterson et al. (2011) recently investigated the relationship of mood and sleep loss, using the Mood II Scale. In their study, Paterson et al. (2011) simulated an environment in which participants were exposed to a strict sleep-wake cycle in an attempt to establish a baseline and measure and regulate the amount of lost sleep. The researchers found that there were statistically significant relationships between sleep loss and activity level, happiness, depression, anger, and fatigue (Paterson et al., 2011). Sleep loss was correlated with decreased frequency and intensity of activation and happiness. Sleep loss was also correlated with increased intensity of depression, anger, and fatigue (Paterson et al., 2011). Although no studies have measured the concurrent validity between the Mood II Scale and the PGWBI, similar terminology is used between the two measures. See Table 12 for a detailed comparison of the measures.

In the present study, night shift workers presented with an increased frequency of excessive sleepiness during awake hours when compared to the day shift workers. Given that Paterson et al. (2011) reported a statistically significant relationship between decreased mood and sleep loss, a possible explanation for the decreased subjective quality of life in the current study is excessive sleepiness. Of note, however, is that the night shift workers in the current study reported more sleep hours than the day shift workers but perhaps the quality of sleep among night shift workers was poorer than that of day shift workers.

Table 12

Comparison of Mood Scale II and Psychological General Well-Being Index Using Common Terminology

Mood Scale II Variables	Common Terminology	PGWBI Variables
Activation[a]	Energetic; Active; Cheerful[a,b]	Vitality; Positive Well-Being[b]
Happiness[a]	Satisfied; Happy[a,b]	Positive Well-Being[b]
Depression[a]	Blue; Depressed[a,b]	Depressed Mood[b]
Fatigue[a]	Inactive; Sluggish[a,b]	Vitality[b]
Fear[a]	Hopeless; Insecure; Uneasy[a,b]	Anxiety; Depressed Mood; Self-Control[b]

Note. Common terminology refers to descriptive characteristics that occurred in both Mood Scale II variables and the PGWBI variables.
[a]Paterson et al. (2011)
[b]Chassany et al. (2004)

Additional explanations for decreased subjective quality of life among night shift workers are limited melatonin secretion and personal control for work demands. Melatonin plays a role in regulating a person's circadian rhythm (Cagnacci et al., 1992). Night shift workers have been reported to produce lower levels of melatonin (Brzezinski,

1997; Cagnacci et al., 1992). Amongst other purposes, melatonin is related to psychological conditions such as Seasonal Affective Disorder and Depression, both of which have sleepiness as a symptom (Brzezinski, 1997).

Researchers have shown that decreased control in work demands and work hours is related to decreased subjective quality of life (Furnham & Hughes, 1999; Smith et al., 2005). In 2005, the U.S. Bureau of Labor Statistics demonstrated that less than 20% of alternative shift workers reported control in the decision to work an alternate shift. The company employing the participants of the current study was unionized. New employees tended to work the night shift hours while the day shift was reserved for individuals with more seniority. Although the impact and existence of personal choice in work shift or work demands was not a focus area of the present study, it might be a possible explanation for the decreased subjective quality of life among the night shift workers.

Secondary Research Questions

Based on the findings within the literature review, there were several secondary research questions for the study. Health status, cognitive and social difficulties, and lifestyle choices were compared with type of work shift, prevalence of occupational balance, and subjective quality of life scores. Two post hoc analyses were performed. The first post hoc analysis answered the question: what are the relationships between sleep habits and subjective quality of life? The second post hoc analysis answered the question: is there a statistically significant difference between day and night shift workers when an alternate definition for occupational balance is applied, known as life balance? Additionally, is there a statistically significant relationship between SQOL and life balance?

Correlations with Work Shift. There were no significant differences between day and night shift workers for health status, cognitive difficulties, or social difficulties (with the exception of excessive sleepiness). There were no statistically significant relationships between work shift and any of the lifestyle choices. The results of the present study are surprising because of the extensive evidence in the literature that suggests that night shift workers have a higher prevalence of health complications, impaired cognitive and social experiences, and occupations such as smoking and drinking (Christiansen, 1996; Costa, 1996, 2003; Harrington, 2001; Kivimaki et al., 2001; Knutsson, 2003; Rajaratnam & Arendt, 2001; Wilcock, 1998b), . Researchers have reported statistically significant relationships between work shift and metabolic disturbances (Biggi et al., 2008; Kivimaki et al., 2001), cardiovascular problems (Costa, 1996; Harrington, 2001; Rajaratnam & Arendt, 2001), gastrointestinal disturbances (Costa, 1996), and cancer (Costa et al., 2010; Megdale et al., 2005).

Researchers have noted the *healthy-worker effect* that might confound results of epidemiological studies of shift workers (Kivimaki et al., 2001; Lipovcan et al., 2004). The possibility remains that individuals who work the night shift have chosen shift work because they are healthy and can tolerate the demands of shift work. It is also possible, especially given the low response rate in the present study, that individuals who struggled with health complications, impaired cognitive and social experiences, and lifestyle choices chose not to participate in the study. Participants might have been apprehensive to report medical conditions or lifestyle choices, out of fear for negative responses from their employer, despite the anonymity of the surveys.

The health of the participant sample was skewed positively. Methodological variables might have influenced the results of the study. Health status was measured by participants checking a box next to any of the following conditions: cardiovascular problems, hypertension, diabetes, digestive problems, weight problems, mental health diagnosis, and cancer. Although the participant might not have been diagnosed with one of the listed conditions, he or she might have experienced symptoms (e.g. heart burn, stomach pain, flatulence), which were not specifically addressed on the demographic sheet, or the participant might not have been willing to disclose his or her true health status.

There were statistically significant relationships between work shift and the PGWBI subdomains of general health and vitality. Questions related to general health included variables such as: frequency of illness, bodily disorder, aches, or pains; healthy enough to carry out activities of interest; and concern for one's health. Questions related to vitality included variables such as energy level and feelings of active and vigorous versus dull and sluggish. The questions for general health and vitality on the PGWBI were broad in nature, allowing more opportunities for self-perception of health status. On the other hand, health status on the demographic sheet was measured by specified diagnoses and medical conditions. Given the discrepancy between the results of the demographic sheet and PGWBI subdomains of general health and vitality, the use of diagnostic categories on the demographic sheet might have been too limiting.

The majority of the individuals in the study experienced difficulty in all areas of cognitive and social skills which included excessive sleepiness, trouble sleeping, slow reaction time, impaired memory, trouble with concentration, and low level of motivation

and self-initiation. Night and day shift workers equally had difficulties in trouble sleeping, impaired memory, and trouble with concentration. Night shift workers reported higher frequencies of excessive sleepiness, slow reaction time, and trouble fulfilling obligations to family and society when compared to day shift workers, which is consistent with several reports found in the literature (Åkerstedt & Wright, 2009; Culpepper, 2010; Drake et al., 2004; Rajaratnam & Arendt, 2001). It has been suggested that night shift workers experience greater levels of excessive sleepiness because of decreased quality of sleep (Drake et al., 2004).

An individual's internal biological processes promote sleepiness during night hours and wakefulness during day hours (Åkerstedt & Wright, 2009). Night shift workers might have difficulty overcoming the internal drive to sleep during the night hours, the time in which he or she is working (Åkerstedt & Wright, 2009). Night shift workers might have difficulty falling asleep and staying asleep for a sustained amount of time as a result of the internal drive to be awake during the day hours (Åkerstedt & Wright, 2009). Environmental factors can have an effect on the sleep quality of night shift workers, such as sunlight, noise, and interruptions from others (e.g. phone calls, door bell). The increased levels of excessive sleepiness might contribute to slow reaction time for night shift workers (Culpepper, 2010).

Harrington (2001) reported that night shift workers have more trouble fulfilling obligations to family and society when compared to day shift workers. Roles and responsibilities that are especially challenging for night shift workers include: childcare, household chores, shopping, and leaving a partner home alone at night (Harrington, 2001). Schwartz and Roth (2006) reported that disturbed social relationships were

escalated when someone had Shift Work Sleep Disorder (SWSD). The results of the current study show that night shift workers had increased levels of excessive sleepiness (one of the diagnostic criteria for SWSD) and trouble fulfilling obligations to family and society, which supports Schwartz and Roth's (2006) findings.

In the present study, both day and night shift workers consumed varied qualities of food while at work. There were higher rates of drinking alcohol among day shift workers. There were higher rates of smoking and taking supplements (prescribed by a physician and over-the-counter) among night shift workers. Despite the increased rates, there was no statistically significant difference between day and night shift workers for any of the lifestyle choices. The results are partially consistent with studies found in the literature. Researchers conducting two separate studies (Biggi et al., 2008; Kivimaki et al., 2001) found that there was a higher prevalence of smoking among night shift workers. Biggi et al., (2008) reported higher incidences of alcohol consumption among night shift workers while Kivimaki et al. (2001) found no statistically significant differences in alcohol consumption between day and night shift workers. Costa (1996) reported that night shift workers were more likely to consume convenience foods, such as prepackaged food or energy drinks including coffee and tea. Costa (1996) hypothesized that the poor eating habits of night shift workers contributed to the higher prevalence of gastrointestinal disorders. In the current study the increased use of medication among night shift workers suggests poorer health and might be related to the poor scores for general health and vitality on the PGWBI.

Correlations with Occupational Balance. One of the primary purposes of the present study was to investigate the presence of occupational balance (OB) between day

and night shift workers based on the theory of the relationship between occupational balance and health. The hypothesis was that shift workers tend to have a higher prevalence of health complications because of a higher prevalence of occupational imbalance. There were no statistically significant differences between individuals who had occupational balance and individuals who had occupational imbalance for any of the variables that made up health status. The "health status" variables included the general health and vitality subdomains of the PGWBI and the health conditions listed on the demographic sheet: cardiovascular problems, hypertension, diabetes, digestive problems, weight problems, mental health diagnosis, and cancer. The results of the current study suggested that there is not an association between OB and health for the individuals who participated in the study. Given the overall healthy nature of the sample, it was difficult to measure the relationships between OB and health.

The relationship between occupation and health has been extensively researched within the field of occupational science (Christiansen, 1996; Clark et al., 1991; Law et al., 1998; Rogers, 1984; Wilcock, 1998a) and is an accepted concept within the field of occupational therapy (Clark et al., 1991; Yerxa et al., 1990). As health care providers, occupational therapy practitioners use occupation as a means to promote better health (AOTA, 2008). Occupational therapy practitioners assist service users to establish daily routines of occupations as an intervention strategy for health promotion (AOTA, 2008). It is surprising, then, that the results of the present study do not support the results of the theory that occupational balance is association with a better health prognosis with one exception. Occupational balance was positively correlated with excessive sleepiness. Participants who met the criteria for occupational balance had lower frequencies for

excessive sleepiness than individuals who met the criteria for occupational imbalance. There were no statistically significant relationships between OB and the other cognitive and social skills.

Possible explanations for a lack of relationship in the current study include: operational definition of occupational balance used; outcome measures for occupational balance, health status, and cognitive and social difficulties used; and the small sample size. Occupational balance is a familiar term in the field of occupational therapy, however, a uniform and agreed upon definition for occupational balance does not exist. Contrary to the results of the current study, Wilcock et al. (1997) found that increased OB was associated with increased health status, based on OB defined as self-perceived fulfillment of needs. This concept will be further explored in the post hoc analysis discussion.

Correlations with Subjective Quality of Life. The study described herein is the first that compared subjective quality of life with the health conditions and the cognitive and social difficulties that are reported as risk factors for night shift workers. The dearth of literature on the topic prompted the research question: is there a statistically significant relationship between subjective quality of life and work shift? There was not a statistically significant difference between the categorical scores for subjective quality of life (SQOL) for any of the health-related variables. There were statistically significant relationships between SQOL and several cognitive and social difficulties. There were also statistically significant relationships between SQOL and the two sleep habits that were included in the post hoc analysis: number of intervals of sleep (napping) and number of total sleep hours.

The results of this study suggest that there is no association between health status and SQOL in this population. Participants who experienced poor SQOL maintained good health, as defined by the absence of medical conditions as listed on the demographic sheet. Similar to the relationship between occupational balance and health status, it was difficult to measure the relationship between subjective quality of life and health status due to the overall self-reported healthy nature of the sample.

Associations existed between SQOL and several of the cognitive and social difficulties. Participants who had poor SQOL were more likely to experience the following cognitive and social difficulties at an increased frequency: excessive sleepiness, trouble sleeping, trouble with concentration, low level of motivation and self initiation, and trouble fulfilling obligations to family and society. Excessive sleepiness has a similar presentation as depression, with symptoms such as impaired memory, decreased concentration, and lethargy (Culpepper, 2010). Culpepper (2010) cautioned the misdiagnoses of depression when the person might actually be coping with Shift Work Sleep Disorder (SWSD), which is "a circadian-rhythm sleep disorder resulting from a sleep-wake pattern that is out of alignment with the individual's internal circadian rhythm" (Schwartz & Roth, 2006, p. 2365). Questions related to depression on the PGWBI included terminology such as: "depressed…down hearted and blue…discouraged… and hopeless" (Chassany et al., 2004, p. 25) which appear more specific to symptoms of depression rather than SWSD. Stress has been hypothesized as one of the factors responsible for the increased prevalence of health conditions among shift workers, especially night shift workers (Costa, 1993, 2003; Culpepper, 2010; Harrington, 2001). It can be hypothesized that stress might play a role in the decreased

cognitive and social skills as well as subjective quality of life. Researchers have reported that the stress shift workers face might result from coping with the work-life balance (Bianchi & Milkie, 2010; Culpepper, 2010; Fujino et al., 2001; Grosswald, 2004; Harrington, 2001). A shift worker might already suffer from decreased quality of sleep and thus, excessive sleepiness. The fatigued and exhausted shift worker might have difficulties with work performance, maintaining responsibilities with family and society, and managing activities of daily living, resulting in stress.

Jambon, Le Gal, and Pilate (1995) reported that insomnia is associated with decreased subjective quality of life. Jambon et al. (1995) used the PGWBI in order to measure SQOL differences between individuals who suffer from insomnia and those who do not. The researchers reported that the mean PGWBI score for individuals who were diagnosed with insomnia was 54.4 (Jambon, Le Gal, & Pilate, 1995), which would place the individual in the "severe distress" category (Chassany et al., 2004). Participants who did not have insomnia scored a mean PGWBI score of 77.3 (Jambon et al., 1995), which would place the individual in the "positive well-being" category (Chassany et al., 2004). Although insomnia was not measured in the current study, it is clear that decreased quantity and quality of sleep is associated with poorer SQOL in relation to anxiety, depression, positive well-being, self-control, general health, and vitality.

A post hoc analysis was completed in which subjective quality of life was compared to the two sleep habits: number of intervals of sleep (napping) and number of total sleep hours. In the current study, individuals who slept for two or more intervals (napping) scored lower for SQOL. In addition, decreased hours of sleep were associated with lower scores for SQOL. One hypothesis might be that when a person takes short

naps rather than a long sustained duration of sleep, he or she might experience decreased quality of sleep due to decreased time in REM sleep; however, this hypothesis needs to be investigated further.

Occupational Balance versus Life Balance. A post hoc analysis of Marino-Schorn's (1986) definition of *occupational balance* and Matuska and Christiansen's (2008) definition of *life balance* was conducted to determine if how one defined balance related to subjective quality of life. For the purposes of the current study, occupational balance was defined as allocating 6-10 hours to each of the following categories of occupations: work, rest and sleep, and leisure. A concern with Marino-Schorn's definition is that the meaning and value that the occupation holds for the participant is not considered nor is the ability for the occupation to meet the participant's basic needs.

One might question whether or not equally distributed amounts of time among work, rest and sleep, and leisure occupations ensure that all physical, social, mental, and rest needs that a person has are met. An equal balance of time does not necessarily mean the participant finds meaning and value in an equally distributed amount of time among work, rest and sleep, and leisure occupations. Also unknown is whether equally distributed amounts of time among work, rest and sleep, and leisure occupations contribute to increased health, well-being, and life satisfaction.

Christiansen & Matuska (2006) argued that a balanced life goes beyond allocating a certain amount of time to activities. The authors explained that the outcomes of a balanced life (e.g. subjective well-being, needs satisfaction, and low stress) also depend on other characteristics of the relationships between occupation and the individual, such as meaning and value of the activity, level of challenge and interest, fulfillment of basic

needs, and contributing to positive relationships with others (Christiansen & Matuska, 2006). Although it was not feasible to measure all the constructs of the Life Balance model, *congruency between desired and actual occupational participation* was measured post hoc.

Life balance was defined as answering "yes" to the question: are you satisfied with the amount of time you devote to work, rest and sleep, and leisure-related activities? There were no statistically significant relationships between occupational balance and any of the subdomains of the PGWBI. There was statistical significance between life balance and subdomains of general health, vitality, and global (overall) psychological general well-being. There was an increased prevalence of life balance among individuals with increased quality of life in the areas of anxiety, positive well-being, and self control, although the relationships only approached statistical significance. The findings suggest that equal distributions of time for work, rest and sleep, and leisure occupations (occupational balance) is potentially not as important as the satisfaction with the balance of work, rest and sleep, and leisure occupations (life balance). Participants who reported life balance were more likely to have increased subjective quality of life in the areas of anxiety, positive well-being, self-control, general health, vitality, and global (overall) psychological well-being.

Matuska and Christiansen (2008) viewed life balance as multidimensional. Life balance was defined as a two-fold concept. First, there must be a satisfaction in the pattern of daily activity. Second, the pattern of daily activity must be "healthful, meaningful, and sustainable" (Matuska & Christiansen, 2008, p. 11). That is, the everyday configurations (i.e. routines) must facilitate a person's ability to:

> (1) meet basic instrumental needs necessary for sustained biological health and physical safety; (2) have rewarding and self-affirming relationships with others; (3) feel engaged challenged, and competent; (4) create meaning and a positive personal identity (Matuska & Christiansen, 2008, p.11).

Matuska (2012) further explained, "to the extent that people are able to engage in configurations of activities that address all of these needs-based dimensions, they will perceive their lives as more satisfying, less stressful, and more meaningful or balanced" (p. 229) See Appendix J for a diagram of the Life Balance model. Therefore, one can assume that the participants in the current study who were satisfied with their balance were meeting the needs described by Matuska and Christiansen, despite unequal distribution of time between work, rest and sleep, and leisure occupations. Individuals who answered "no" might be lacking in fulfillment of one or more needs, which might be a result of decreased available time to participate in certain occupations (i.e. occupational imbalance). Time management is an important construct in the model of life balance, but is unique for each person's needs, and changes over time (Matuska & Christiansen, 2008).

There was a higher percentage of participants who met the criteria for life balance than for occupational balance. There was no statistically significant difference between day and night shift workers for life balance. The results of the current study suggest that life balance and occupational balance are not associated with work shift. A possible hypothesis is that the respondents who work the night shift have built a tolerance to shift work and therefore are adequately meeting their time management and needs-fulfillment.

Limitations

The primary factors that might have negatively influenced the results of the current study are the number of participants who responded and the potential for the healthy worker effect. Twenty-one employees at a local auto parts manufacturing plant participated in the study, of which 14 were categorized as day shift workers and seven as night shift workers. The small sample size might have skewed the results, which would have resulted in a Type II error. Frequency statistics and cross-tabulations were used to support findings and suggest emerging trends within the sample. Given the low response rate, it was likely that the various types of participants were not equally represented (e.g. those who are healthy vs. those who are unhealthy; those with occupational balance vs. those with occupational imbalance; those with high subjective quality of life vs. those with low subjective quality of life). Given the extensive evidence in the literature, it can be assumed that there was not an equal representation of employees in regards to occupational balance, subjective quality of life, health status, and lifestyle choices. It is also possible that individuals with increased occupational balance and health status were more able and willing to participate in the study.

The outcome measures used might have influenced the results. The time diary method was used to measure time use because of the preliminary and descriptive nature of the study. There have been no other studies to date that have outlined what activities make up a shift worker's day and related those results to occupational balance. Health, cognitive status, and social status can be measured objectively and subjectively. Objective measurement of health and cognitive status would have included physical examination and standardized cognitive assessments. Health and cognitive statuses have

been objectively measured in the literature and were secondary to the primary purposes of the study. Therefore, subjective measurements with self-perceived responses were taken.

Environment has been shown to influence shift work tolerance (Costa, 2003). Costa (2003) reported that "environmental conditions (e.g. lighting), job content, fluctuations in work load, time pressure, working hours scheduling, the number of workers, and supervision levels" (p. 85) can influence the tolerance to shift work and decrease the likelihood of negative symptoms that have been associated with shift work. The manufacturing plant from which the employees were recruited allowed overtime hours during the time of data collection. The individually reported work shifts might have been skewed when compared to the data from the survey packets because of people working extended hours and shifts that they do not typically work. A formal ergonomic assessment of the manufacturing plant from which the employees were recruited was not completed. However, it was known that the company had an on-campus health and wellness department as well as a pool and fitness center. It can be assumed that the company had an interest and investment in the well-being of its employees. Since only one company agreed to allow participation in the study, the effects of the specific work environment could not be ascertained. A company to company comparison was not the intent of the study, but a wider pool of participants from more companies might have resulted in a more normal distribution of worker characteristics.

Chapter Six: Summary

Conclusion

The study described herein was the first known study to investigate occupational balance and subjective quality of life between day and night shift workers. Researchers have reported negative symptoms associated with shift work, particularly night shift work, including sleep disorders (Schwartz & Roth, 2006), melatonin suppression (Cagnacci et al., 1992), metabolic and cardiovascular disorders (Biggi et al., 2008; Karlsson et al., 2001), and gastrointestinal disorders (Knutsson, 2003). Despite the evidence for increased health complications among night shift workers, little research has been done to investigate probable causes. Based on the theory that occupational balance is associated with health, two questions were posed: 1) is there a statistically significant difference between day and night shift workers for the prevalence of occupational balance and 2) is there a statistically significant relationship between work shift and subjective quality of life? Based on the foundational findings in the literature, secondary research questions were investigated including health status, cognitive and social difficulties, and lifestyle choices.

Twenty-one employees (14= day shift, 7= night shift) at a local auto parts manufacturing plant completed survey packets containing a demographic sheet, time diary, and Psychological General Well-being Index (PGWBI). The demographic sheet was used to collect basic demographic information as well as measure health status, cognitive and social difficulties, and lifestyle choices. The time diary was used to collect data on the occupations in which the participants engaged with a result of categorization

as having occupational balance or occupational imbalance. The PGWBI was used to measure subjective quality of life.

There was a high prevalence of occupational imbalance among the total sample of shift workers but there was no statistically significant difference between day and night shift workers for the prevalence of occupational balance. Tolerance to shift work might influence the result of epidemiological studies of work shift, and should be taken into consideration. Although occupational therapists accept the theory of occupational balance and health, there is a lack of a uniform and agreed upon operational definition. The definition used for the current study was a time-based definition proposed by Marino-Schorn (1986) in which occupational balance was equal distribution of time amongst work, rest and sleep, and leisure occupations. Alternative definitions for occupational balance are based on chronobiology, balance among life tasks, needs fulfillment, life balance, and role balance. Matuska and Christiansen (2008) focus on meaning, value, and need fulfillment. Wilcock, who developed the concept of occupational imbalance, uses a needs-based approach (1998a).

A statistically significant relationship was found between work shift and subjective quality of life, which comprised the following subdomains: anxiety, depressed mood, positive well-being, self-control, general health, and vitality. Night shift workers reported lower levels of subjective quality of life. The mean global PGWBI score for night shift workers appeared in the *severe distress* category as opposed to *moderate distress* or *positive well-being*. One hypothesis for the decreased subjective quality of life among night shift workers is the possible prevalence of Shift Work Sleep Disorder (SWSD). Shift Work Sleep Disorder is a circadian rhythm-based disorder in which a shift

worker experiences excessive sleepiness during awake hours and/or insomnia during sleep hours (Schwartz & Roth, 2006). Excessive sleepiness was correlated with work shift, occupational balance, and poorer subjective quality of life.

There were no statistically significant differences between day and night shift workers for health status or lifestyle choices. There were no statistically significant relationships of cognitive difficulties or social difficulties with work shift (with the exception of excessive sleepiness). There were no statistically significant relationships of health status, cognitive difficulties, or social difficulties with occupational balance. Statistically significant relationships were found between subjective quality of life and several cognitive and social difficulties. There was no statistically significant difference between the categorical subjective quality of life scores for any of the health-related variables. It was difficult to make conclusions about health status due to the overall healthy nature of the sample. Factors that might have influenced the results include the small sample size, environment in which the participants worked, outcome measures used, and the potential for the healthy worker effect.

A post hoc analysis was performed to compare the relationship between subjective quality of life (PGWBI scores) and the data based on two different definitions of occupational balance. Marino-Schorn's (1986) definition of occupational balance was used for the purposes of this study. Matuska and Christiansen (2008) proposed an alternate definition, termed "life balance" which was used for the post hoc analysis. While there were no statistically significant relationships between occupational balance as defined by Marino-Schorn and any of the subdomains of the PGWBI, there was

statistical significance and trends towards significance between life balance and several of the subdomains of the PGWBI.

An additional area of investigation in the post hoc analysis was the correlation between sleep habits and the other variables in the study. Statistically significant relationships were found between hours of sleep and subjective quality of life as well as number of sleep intervals (napping) and subjective quality of life. Increased PGWBI scores were positively correlated with increased hours of sleep while increased PGWBI scores were inversely correlated with increased intervals of sleep (napping).

Strategies for Shift Workers

Information gleaned from the results of this study and Picard's (2011) short course on sleep as an area of occupational therapy, were used to draft a handout for the employees of the auto parts manufacturing company. See Appendices L – M for a complete version of the handout. The handout included a list of online resources as well as strategies for promoting positive well-being and quality of life by establishing a healthy routine and sleep habits.

Recommendations for Future Research

The field of occupational therapy would benefit from a consistent definition of occupational balance. Marino-Schorn (1986) has published one article in which she used the Marino-Schorn Activity Log to investigate the relationship between occupational balance and morale, using the time-budget definition. Wilcock et al. (1997) piloted a questionnaire in which occupational balance was defined by variance in self-perceived ideal and current levels of participation in physical, social, mental, and rest occupations. Matuska and Christiansen's (2008) theory on life balance is emerging and seems to be

more in line with the current views in the occupational therapy profession. Matuska and Christiansen are in the process of publishing standardized assessments to measure life balance, such as the Life Balance Inventory (Matuska, 2010; 2012). Further research is recommended with the focus on investigating the various definitions of occupational balance that have been proposed, in order to determine which is most consistent with the lived experience of the person.

It can be assumed that occupational balance differs for people across the lifespan and during different phases of life. An infant might need more rest than the other categories. A young child might want and need more play than work or rest. Young adults beginning their career might desire more work so they can feel they are contributing to their society and profession. Retirees might feel they deserve to relax and desire more leisure. Further research is recommended for what constitutes occupational balance and how it changes across the lifespan.

Stress is a major factor in health status. While this study did not specifically measure stress, future research into stress associated with occupational imbalance and health should be conducted. Occupational balance and conflict between life roles might directly associate with one's level of stress, and thus their health status. Future research on the roles that shift workers are able to take on and role conflict might prove beneficial.

Given that the literature and the study described herein support the relationship between work shift and occupational balance and subjective quality of life, it is important to keep the shift worker population in the forefront of additional research. The majority of the published literature that examines night shift workers is based on the nursing profession. Several professions incorporate 24-hour shift systems. As health care

providers, occupational therapists have a duty to promote health and well-being for populations at risk and effective interventions for the population of shift workers hinges on future research.

Appendix A: Recruitment Statement

My name is Jennifer Langenberg. As an Ithaca College occupational therapy graduate student, I am inviting you to participate in a research study that will be used to identify possible trends between health status, occupational balance, subjective quality of life, and one's work shift. This study will fulfill the research requirements for graduation from the occupational therapy program. Occupational balance means that a person spends equal amounts of time in work, rest/ sleep, and leisure activities. Subjective quality of life is how satisfied a person is with their life and the person's perceptions about their well-being.

*Studies have found that shift workers, especially night shift workers, are at increased risk for health-related problems, including: cancer, metabolic disorders, cardiovascular disorders, gastrointestinal disorders, and more. In addition, night shift workers may suffer from constant sleepiness, impacting their work performance and productivity. They may be at increased risk for injury while at work, due to their sleepiness. At the end of this presentation there will be a list of research articles that support these findings.

As a previous night shift worker, and wife of a current night shift worker, I have first hand experience in the challenges that shift workers face, including: finding time to spend with family and friends, getting adequate sleep, constant sleepiness, eating substantial meals the same time each day, performing at my best while at work, fulfilling responsibilities to family and society, and running errands when stores, banks, etc. are open for business.

Each of us chooses to work the shift we do for our various reasons. We can adapt our lives to fit these work schedules and still live healthy, balanced lives. But how? And what aspects of our lives affect our health status?

It is crucial that participants from all work shifts participate in this study so that the data can be used to find differences among those shifts. Your unique circumstance as a shift worker in an industrial facility in the Ithaca, NY area makes your participation greatly impact the outcomes of this study. The results of this study will add to the limited knowledge about occupational balance, health, and work shift. It is my long-term goal to identify possible explanations for why shift workers are more prone to adverse health conditions, especially night shift workers, and developing a program that educates shift workers on strategies to promote better health.

As a participant of this study you will be asked to fill out a demographic sheet, questionnaire, and time diary. The Demographic Sheet asks questions related to the presence of adverse health conditions, work environment, work shift, and salary range. It

is expected to take 5-10 minutes to complete the Demographic Sheet. The questionnaire is titled the General Well-being Schedule" and asks questions related to recent feelings of the participant's subjective quality of life including emotional and physical elements of well-being. It is expected to take 10-15 minutes to complete the General Well-being Schedule. The Time Diary asks the participant to list the activities that they have done during the day, and other information about the activities. Participants are asked to complete the time diary for 3 days, including 2 weekdays and 1 weekend day. It is expected to take 10-15 minutes each day to complete the Time Diary.

You can choose to complete a paper version of these assessments and mail them back to me, or complete an electronic version of the assessments on Survey Monkey. All of the assessments will remain anonymous and confidential. There will be no identifying information on the assessments other than a participant number, which will be used to track how many assessments are distributed and how many are received. The research assistant will randomly assign participant numbers to each participant. She will not have access to the completed assessments. I will not have access to the form used to assign participant numbers. Halfway through the study, I will give the research assistant a list of participant numbers that have not returned the assessment packets. She will send a reminder statement to those participants. All data will be kept in a locked filing cabinet located in the occupational therapy department at Ithaca College. After seven years, the data will be destroyed via shredding.

To be eligible to participate in the study you must be over 18 years of age, employed full time as a shift worker in an industrial setting, and be able to read and understand an English version of the assessments. As an incentive to participate in the study, all participants of the study will be eligible to enter a drawing for a $100 Visa Gift Card. Also, if you decide to participate in the study, you may choose to withdraw from the study at any time.

If you are interested in participating in this study you can contact the research assistant, Christine Slocombe, via email at shiftwork.study@gmail.com or phone at (413) 687-8004 with your mailing address or email address depending on whether you would prefer mailed or electronic assessments. If you have any questions about the study you can contact me via email at jen.langenberg@gmail.com, or by phone at (215) 692-3961.

Appendix B: Statement of Second Contact

Dear (company name) employee,

Thank you so much for your time for me to be able to present my research study to you in the last couple of weeks. As I reminder, the study is looking at trends between the work shifts in regards to balance in one's life (occupational balance), subjective quality of life, and health status. When I began learning about occupational balance as a principle in occupational therapy, I immediately thought back on my experiences as a shift worker and became interested in how it manifests itself in shift workers as a whole. One major area of occupational therapy that can help shift workers is through establishing practical and efficient routines. My hope is to use this research to find trends among the different shifts, and develop a program that educates shift workers on strategies to promote better health and a more balanced life.

Shift workers are often over looked in research about health, wellness, and/or a balanced life. Yet, shift workers are very familiar with the implications that shift work has on their health and well-being. Shift workers deserve to be included in the research so that trends can be identified and adverse health conditions and occupational imbalance can be avoided.

You are among a limited number of people who are invited to participate and each response is crucial to the success of the study's outcomes and possibly a foundation for further research in the future. My hope is to have at least 100 interested participants for each shift so that the data can be deemed reliable and valid. Please consider participating in this research study and contact Christine Slocombe by **December 3, 2010** with your contact information and preference of paper or online surveys. You can email Christine at shiftwork.study@gmail.com or call her at (413) 687-8004.

Thank you!

Jennifer Langenberg
Ithaca College
Occupational Therapy Graduate Student
Phone: (215) 692-3961
Email: jen.langenberg@gmail.com

Appendix C: Email Correspondence from MAPI Research Institute –

Permission to Use PGWBI on Survey Monkey

Dear Jennifer,

Thank you very much for your consideration and patience. The online version of the PGWBI conforms to the copyright regulations so you have our approval and you can start administering it to patients. Preferably, we would like to see the copyright details on every page but I know this may not be possible so don't worry about that if it causes too many complications

We wish you all the best.

Kind regards,
Amy

Come see us at:
** ISPOR (November 6-9th) at the Prague Congress Center in Prague*
** CBI's 7th Forum on Patient Reported Outcomes (PRO) (November 17-18th) at the Hyatt Regency in Philadelphia*
Amy Winterbotham
Project Assistant
PRO Information Support
MAPI RESEARCH TRUST
27 rue de la Villette |69003 Lyon | France
Tel: +33 (0) 4 72 13 65 75 | Fax: +33 (0) 4 72 13 66 82 |
awinterbotham@mapigroup.com | www.mapi-trust.org | www.mapi-research.com | www.groupemapi.com | www.proqolid.org | www.mapi-prolabels.org

Appendix D: Cover Letters

Dear Eligible Participant,

You are receiving this assessment packet because you have expressed interest in participating in the research study titled "Occupational Balance: A Time Use Study of Industrial Shift Workers." As a reminder, the research is designed to examine the relationships between health status, occupational balance, subjective quality of life, and one's work shift. Occupational balance means that a person spends equal amounts of time in work, rest/ sleep, and leisure activities. Subjective quality of life is how satisfied a person is with his or her life and his or her perceptions about their well-being.

The information from the study will add to the limited knowledge about occupational balance, health, and work shift. It is the long-term goal of the researcher to identity possible explanations for why shift workers are more prone to adverse health conditions, and to develop a program that educates shift workers on strategies to promote better health.

All surveys are anonymous. ***Please do not put your name or any other identifying information on either the surveys or envelopes.*** All information returned to the researcher will remain confidential and will only be accessible to the researcher. If you feel uncomfortable with any of the questions on the surveys, you may choose to leave the question blank. You may withdraw from the study at any time. Please return all surveys, even if they are incomplete, using the envelope provided by **December 19, 2010.**

There are three surveys in the survey packet: the Demographic Sheet, Time Diary, and General Well-being Schedule. The **Demographic Sheet** asks questions related to the presence of adverse health conditions, work environment, work shift, and salary range. It is expected to take 5-10 minutes to complete the demographic sheet. The **General Well-being Schedule** asks questions related to recent feelings of the participant's subjective quality of life including emotional and physical elements of well-being. It is expected to take 10-15 minutes to complete the General Well-being Schedule. The **Time Diary** asks you to list the activities you have done during the day, and other information about the activities. Participants are asked to complete the time diary for 3 days, including 2 weekdays and 1 weekend day. It is expected to take 10-15 minutes each day to complete the time diary. **Although you are encouraged to complete the time diary throughout the day, please do not fill it out while you are at work.** Please return all three surveys in the same envelope.

As a participant in this study, you have the opportunity to enter a drawing to win a **$100 Visa Gift Card**. If you choose to withdraw from the study you forfeit the right to enter the drawing. The drawing will occur on **December 20, 2010.** Entries will be collected from participants who are employed at [list of companies]. The name of the winner will be announced on **December 21, 2011.** The results of the study will be made available to all participants by the researcher in aggregated form via a report distributed to the supervisors at your employment site. By submitting the entry form for the drawing for the gift card, you give permission to the researcher to disclose your name if selected as the winner.

Sincerely,

Jennifer Langenberg
Graduate Student
Occupational Therapy Department
Ithaca College
Email: jen.langenberg@gmail.com
Phone: (215) 692-3961

Dear Eligible Participant,

You are receiving this email because you have expressed interest in participating in the research study titled "Occupational Balance: A Time Use Study of Industrial Shift Workers." As a reminder, this study is looking for the relationship between health status, occupational balance, subjective quality of life, and one's work shift. Occupational balance means that a person spends equal amounts of time in work, rest/ sleep, and leisure activities. Subjective quality of life is how satisfied a person is with his or her life and his or her perceptions about well-being.

The information from the study will ad to the limited knowledge about occupational balance, health, and work shift. It is the long-term goal of the researcher to identify possible explanations for why shift workers are more prone to adverse health conditions, especially night shift workers, and developing a program that educates shift workers on strategies to promote better health.

Your participant number is:

Please include your participant number where applicable on all assessment forms. In order to ensure that the forms remain anonymous please include *only* the participant number. ***Do not put your name or any other identifying information on any of the assessment forms.*** All information returned to the researcher will remain confidential and will only be accessible to the researcher. If you feel uncomfortable with any of the questions on the surveys, you may choose to leave the question blank. You may choose to withdraw from the study at any time. Please complete all surveys by **December 19, 2010.**

There are three surveys in the survey packet: the Demographic Sheet, Time Diary, and General Well-being Schedule. The **Demographic Sheet** asks questions related to the presence of adverse health conditions, work environment, work shift, and salary range and is expected to take 5-10 minutes to complete The **General Well-being Schedule** asks questions related to recent feelings of the participant's subjective quality of life including emotional and physical elements of well-being and is expected to take 10-15 minutes to complete. The **Time Diary** asks you to list the activities you have done during the day, and other information about the activities. Participants are asked to complete the time diary for 3 days, including 2 weekdays and 1 weekend day. It is expected to take 10-15 minutes each day to complete the time diary. **Although you are encouraged to complete the time diary throughout the day, please do not fill it out while you are at work.**

As a participant in this study, you have the opportunity to enter a drawing to win a **$100 Visa Gift Card.** If you choose to withdraw from the study you forfeit the right to enter the drawing. The drawing will occur on **December 20, 2010.** Entries will be collected from participants who are employed at [list of companies]. The name of the winner will be announced on **December 21, 2011** along with the results of the study, to all participants. By submitting this entry, you give permission to the researcher to disclose your name if selected as the winner.

Each assessment has a unique web link. These web links are listed below. Completion of **all** the surveys is very important to the outcome of the study, as trends will be analyzed amongst the surveys. The entry form for the drawing is optional.

When you are working on the surveys, when you click "Exit Survey" it automatically saves your survey so that when you click on the survey link again, you will start where you left off.

- **Participant Demographic Sheet** [http://www.surveymonkey.com/s/demographic_sheet]
- **Time Diary: Weekday 1** [http://www.surveymonkey.com/s/td_weekday1]
- **Time Diary: Weekday 2** [http://www.surveymonkey.com/s/td_weekday2]
- **Time Diary: Weekend Day 1** [http://www.surveymonkey.com/s/td_weekend]
- **General Well-being Schedule** [http://www.surveymonkey.com/s/gwbs]
- **Entry Form For Drawing For $100 Visa Gift Card** [http://www.surveymonkey.com/s/entry_form]

By completing and submitting the surveys you certify that you:

- ☐ Give informed consent to participate in the study
- ☐ Are over 18-years old
- ☐ Are employed full time as a shift worker in an industrial setting
- ☐ Can read and understand an English version of the surveys

Sincerely,

Jennifer Langneberg
Graduate Student
Occupational Therapy Department
Ithaca College
Email: jen.langenberg@gmail.com
Phone: (215) 692-3961

Appendix E: Entry Form for Drawing

Entry Form For Drawing
Prize: $100 Visa Gift Card

Please fill in the entry form and return to the researcher in the small envelope included in the packet. Please seal the envelope. It will be separated from the survey documents and opened just prior to the drawing.

Name: _____

How would you like to be contacted if you win?

[ ] Phone: _____

[ ] Email: _____

[ ] Mail: _____
Street Address

_____
City, State, Zip

By returning this entry form, you give permission to the researcher to disclose your name if selected as the winner.

Appendix F: Participant Demographic Sheet

Participant Demographic Sheet

Background: Studies have shown that shift workers, especially those who work night shift, are at increased risk for health problems. Information from the demographic sheet will be used to inform the researcher about potential links between health status, occupational balance, subjective quality of life and work shift.

Directions:

1. Fill out identifying data, including: work shift, years working on that shift, age, and gender. ***Please do not write your name on this sheet.***
2. Place a check mark next to any of the conditions/ lifestyle choices that you have.

Current work shift: _____ Participant #: _____

Years on that shift: _____ Age: _____

Is your shift permanent, rotating, or varied: _____ Gender: _____

If rotating, how often does it change: _____

How many hours per week do you work on average: _____

Do you have any of the following conditions:

Cardiovascular (heart) problems	☐
Hypertension	☐
Diabetes	☐
Digestive problems	☐
Weight problems	☐
Mental health diagnosis	☐
Cancer	☐

Do you partake in any of the following activities:

Smoking	☐
Drinking alcohol	☐
Taking supplements for health/ sleep problems – prescribed by a physician	☐
Taking over-the-counter supplements for health/ sleep problems – self-prescribed	☐

Do you work:	In a cubical	☐
	In an office	☐
	On a production line	☐

Which company do you work for:

☐	Borg Warner	☐	Tessy Plastics
	Cayuga Press		Vanguard Printing, LLC
☐	Marietta Corporation	☐	Welch Allyn
	Nucor		

Rate how often you experience the following conditions:

	Never	Sometimes	Often	Frequently
Trouble Sleeping	☐	☐	☐	☐
Excessive sleepiness during awake hours	☐	☐	☐	☐
Slow reaction time	☐	☐	☐	☐
Impaired memory	☐	☐	☐	☐
Trouble with concentration	☐	☐	☐	☐
Low level of motivation/ self-initiation	☐	☐	☐	☐
Trouble fulfilling obligations to family	☐	☐	☐	☐

Indicate your salary range:

Salary Range	$7.50-$10.00/ hr	☐
	$10.01-$15.00/ hr	☐
	$15.01-$20.00/ hr	☐
	Over $20.00/ hr	☐

While at work, you primarily eat:	Junk/ processed food	☐
	Vending machine food	☐
	Fresh fruits/ veggies from home	☐
	Other food from home	☐

Jennifer Langenberg
Occupational Therapy, Graduate Student
Ithaca College

Appendix G: Time Diary

Date: _____ Work Shift: _____ Participant # _____ 1

Instructions
1. For each hour of the day, ***list*** the activities you did and where you did the activities. 2. ***Circle*** the type of person you did the activity with and whether the activity was work-related, rest/ sleep-related, or leisure-related.

Definitions
Work-related activity = activities that you are obligated to do in order to sustain life, care for yourself and others, or fulfill any responsibilities that you have. Rest/ Sleep-related activity = quiet and effortless activities that enable the mind and body to relax (Nurit & Michel, 2003, p.27) Leisure activity = desired activities that are chosen because you are interested and motivated to do them. They occur during discretionary time.

	Activity (What Am I Doing?)	**Place** (Where Am I Doing It?)	**Participants** (Who Am I Doing the Activity With?)	**Work, Rest/ Sleep, Or Leisure**
Midnight	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
1:00 AM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
2:00 AM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
3:00 AM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
4:00 AM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
5:00 AM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
6:00 AM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
7:00 AM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure

Date: _____ Work Shift: _____ Participant # _____ 2

Definitions
Work-related activity = activities that you are obligated to do in order to sustain life, care for yourself and others, or fulfill any responsibilities that you have Rest/ Sleep-related activity = quiet and effortless activities that enable the mind and body to relax (Nurit & Michel, 2003, p.27) Leisure activity = desired activities that are chosen because you are interested and motivated to do them. They occur during discretionary time.

	Activity (What Am I Doing?)	Place (Where Am I Doing It?)	Participants (Who Am I Doing the Activity With?)	Work, Rest/ Sleep, Or Leisure
8:00 AM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
9:00 AM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
10:00 AM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
11:00 AM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
Noon	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
1:00 PM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
2:00 PM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
3:00 PM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
4:00 PM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure

Date: _____ Work Shift: _____ Participant # _____ 3

Definitions
Work-related activity – activities that you are obligated to do in order to sustain life, care for yourself and others, or fulfill any responsibilities that you have Rest/ Sleep-related activity – quiet and effortless activities that enable the mind and body to relax (Nurit & Michel, 2003, p.27) Leisure activity – desired activities that are chosen because you are interested and motivated to do them. They occur during discretionary time.

	Activity (What Am I Doing?)	Place (Where Am I Doing It?)	Participants (Who Am I Doing the Activity With?)	Work, Rest/ Sleep, Or Leisure
5:00 PM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
6:00 PM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
7:00 PM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
8:00 PM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
9:00 PM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
10:00 PM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure
11:00 PM	:00 :15 :30 :45		Alone, Family, Friend, or Coworker	Work, Rest/ Sleep, or Leisure

Was this a typical day for you? _____

Are you satisfied with the amout of time you devote to work, rest/ sleep, and lesiure related activities?

Appendix H: Psychological General Well-being Index (sample version)

THE GENERAL WELL-BEING SCHEDULE

NAME: _____ SEX: M: [ ] F: [ ] AGE: ___
Last First Middle

READ: This section of the examination contains questions about how you feel and how things have been going with you. For each question check [ ] the answer which best applies to you.

1. How have you been feeling in general during the past month?
(Check one box)

- In excellent spirits ☐
- In very good spirits ☐
- In good spirits mostly ☐
- I have been up and down in spirits a lot ☐
- In low spirits mostly ☐
- In very low spirits ☐

2. How often were you bothered by any illness, bodily disorder, aches or pains during the past month?
(Check one box)

- Every day ☐
- Almost every day ☐
- About half of the time ☐
- Now and then, but less than half the time ☐
- Rarely ☐
- None of the time ☐

3. Did you feel depressed during the past month?
(Check one box)

- Yes - to the point that I felt like taking my life ☐
- Yes - to the point that I did not care about anything ☐
- Yes - very depressed almost every day ☐
- Yes - quite depressed several times ☐
- Yes - a little depressed now and then ☐
- No - never felt depressed at all ☐

4. Have you been in firm control of your behavior, thoughts, emotions or feelings during the past month?
(Check one box)

- Yes, definitely so ☐
- Yes, for the most part ☐
- Generally so ☐
- Not too well ☐
- No, and I am somewhat disturbed ☐
- No, and I am very disturbed ☐

5. Have you been bothered by nervousness or your "nerves" during the past month?
(Check one box)

- Extremely so - to the point where I could not work or take care of things ☐
- Very much so ☐
- Quite a bit ☐
- Some - enough to bother me ☐
- A little ☐
- Not at all ☐

6. How much energy, pep, or vitality did you have or feel during the past month?
(Check one box)

- Very full of energy - lots of pep ☐
- Fairly energetic most of the time ☐
- My energy level varied quite a bit ☐
- Generally low in energy or pep ☐
- Very low in energy or pep most of the time ☐
- No energy or pep at all - I felt drained, sapped ☐

7. I felt downhearted and blue during the past month.
(Check one box)

- None of the time ☐
- A little of the time ☐
- Some of the time ☐
- A good bit of the time ☐
- Most of the time ☐
- All of the time ☐

8. **Were you generally tense or did you feel any tension during the past month?**
(Check one box)

- Yes - extremely tense, most or all of the time ☐
- Yes - very tense most of the time ☐
- Not generally tense, but did feel fairly tense several times ☐
- I felt a little tense a few times ☐
- My general tension level was quite low ☐
- I never felt tense or any tension at all ☐

9. **How happy, satisfied, or pleased have you been with your personal life during the past month?**
(Check one box)

- Extremely happy - could not have been more satisfied or pleased ☐
- Very happy most of the time ☐
- Generally satisfied - pleased ☐
- Sometimes fairly happy, sometimes fairly unhappy ☐
- Generally dissatisfied or unhappy ☐
- Very dissatisfied or unhappy most or all the time ☐

10. **Did you feel healthy enough to carry out the things you like to do or had to do during the past month?**
(Check one box)

- Yes - definitely so ☐
- For the most part ☐
- Health problems limited me in some important ways ☐
- I was only healthy enough to take care of myself ☐
- I needed some help in taking care of myself ☐
- I needed someone to help me with most or all of the things I had to do ☐

11. **Have you felt so sad, discouraged, hopeless, or had so many problems that you wondered if anything was worthwhile during the past month?**
(Check one box)

- Extremely so - to the point that I have just about given up ☐
- Very much so ☐
- Quite a bit ☐
- Some - enough to bother me ☐
- A little bit ☐
- Not at all ☐

12. I woke up feeling fresh and rested during the past month.
(Check one box)

- None of the time ☐
- A little of the time ☐
- Some of the time ☐
- A good bit of the time ☐
- Most of the time ☐
- All of the time ☐

13. Have you been concerned, worried, or had any fears about your health during the past month?
(Check one box)

- Extremely so ☐
- Very much so ☐
- Quite a bit ☐
- Some, but not a lot ☐
- Practically never ☐
- Not at all ☐

14. Have you had any reason to wonder if you were losing your mind, or losing control over the way you act, talk, think, feel or of your memory during the past month?
(Check one box)

- Not at all ☐
- Only a little ☐
- Some - but not enough to be concerned or worried about ☐
- Some and I have been a little concerned ☐
- Some and I am quite concerned ☐
- Yes, very much so and I am very concerned ☐

15. My daily life was full of things that were interesting to me during the past month.
(Check one box)

- None of the time ☐
- A little of the time ☐
- Some of the time ☐
- A good bit of the time ☐
- Most of the time ☐
- All of the time ☐

16. Did you feel active, vigorous, or dull, sluggish during the past month?
(Check one box)

- ☐ Very active, vigorous every day
- ☐ Mostly active, vigorous - never really dull, sluggish
- ☐ Fairly active, vigorous - seldom dull, sluggish
- ☐ Fairly dull, sluggish - seldom active, vigorous
- ☐ Mostly dull, sluggish - never really active, vigorous
- ☐ Very dull, sluggish every day

17. Have you been anxious, worried, or upset during the past month?
(Check one box)

- ☐ Extremely so - to the point of being sick or almost sick
- ☐ Very much so
- ☐ Quite a bit
- ☐ Some - enough to bother me
- ☐ A little bit
- ☐ Not at all

18. I was emotionally stable and sure of myself during the past month.
(Check one box)

- ☐ None of the time
- ☐ A little of the time
- ☐ Some of the time
- ☐ A good bit of the time
- ☐ Most of the time
- ☐ All of the time

19. Did you feel relaxed, at ease or high strung, tight, or keyed-up during the past month?
(Check one box)

- ☐ Felt relaxed and at ease the whole month
- ☐ Felt relaxed and at ease most of the time
- ☐ Generally felt relaxed but at times felt fairly high strung
- ☐ Generally felt high strung but at times felt fairly relaxed
- ☐ Felt high strung, tight, or keyed-up most of the time
- ☐ Felt high strung, tight, or keyed-up the whole month

6

20. I felt cheerful, lighthearted during the past month.
(Check one box)

None of the time	☐
A little of the time	☐
Some of the time	☐
A good bit of the time	☐
Most of the time	☐
All of the time	☐

21. I felt tired, worn out, used up, or exhausted during the past month.
(Check one box)

None of the time	☐
A little of the time	☐
Some of the time	☐
A good bit of the time	☐
Most of the time	☐
All of the time	☐

22. Have you been under or felt you were under any strain, stress, or pressure during the past month?
(Check one box)

Yes - almost more than I could bear or stand	☐
Yes - quite a bit of pressure	☐
Yes, some - more than usual	☐
Yes, some - but about usual	☐
Yes - a little	☐
Not at all	☐

Appendix I: Field Test Feedback Form

Dear Eligible Participant,

My name is Jennifer Langenberg. As an Ithaca College occupational therapy graduate student, I am inviting you to participate in a research study that will be used to identify possible trends between health status, occupational balance, subjective quality of life, and one's work shift. This study will fulfill the research requirements for graduation from the occupational therapy program. Occupational balance means that a person spends equal amounts of time in work, rest/ sleep, and leisure activities. Subjective quality of life is how satisfied a person is with their life and the person's perceptions about their well-being.

Your participation during the field test stage of the study will be used to determine the quality and efficiency of the surveys that are used in the study. This is a very important component to of the research study, and you are one of a select few who are invited to participate. The information from the study will add to the limited knowledge about occupational balance, health, and work shift. It is the long-term goal of the researcher to identity possible explanations for why shift workers are more prone to adverse health conditions, and to develop a program that educates shift workers on strategies to promote better health.

All surveys are anonymous. ***Please do not put your name or any other identifying information on either the surveys or envelopes.*** All information returned to the researcher will remain confidential and will only be accessible to the researcher. If you feel uncomfortable with any of the questions on the surveys, you may choose to leave the question blank. You may withdraw from the study at any time. Please return all surveys, even if they are incomplete, using the envelope provided by **Monday, November 8, 2010.**

There are three surveys in the survey packet: the Demographic Sheet, Time Diary, and General Well-being Schedule. The **Demographic Sheet** asks questions related to the presence of adverse health conditions, work environment, work shift, and salary range. It is expected to take 5-10 minutes to complete the demographic sheet. The **General Well-being Schedule** asks questions related to recent feelings of the participant's subjective quality of life including emotional and physical elements of well-being. It is expected to take 10-15 minutes to complete the General Well-being Schedule. The **Time Diary** asks you to list the activities you have done during the day, and other information about the activities. Participants are asked to complete the time diary for 3 days, including 2 weekdays and 1 weekend day. It is expected to take 10-15 minutes each day to complete the time diary. Although you are encouraged to complete the time diary as your day progresses, please do not fill out the time diary during your work shift. Please return all three surveys in the same envelope.

Thank you very much for your time and considering in participating in the field test of this research study.

Sincerely,

Jennifer Langenberg
Graduate Student
Occupational Therapy Department
Ithaca College
Email: jen.langenberg@gmail.com
Phone: (215) 692-3961

Dear Participant,

Thank you for participating in the field test of the research study titled, "Occupational Balance: Time Use Study of Industrial Shift Workers." Your participation and feedback are appreciated and beneficial to the research study.

Please answer the questions in reference to your experience in completing the surveys within the assessment packet. As a reminder, the surveys include: Participant Demographic Sheet, Time Diary, and Psychological General Well-being Schedule.

Sincerely,

Jennifer Langenberg
Graduate Student
Occupational Therapy Department
Ithaca College

Feedback On Your Experience

1. How easy were the surveys to fill out? (Circle your response)

Very Hard Somewhat Hard Somewhat Easy Very Easy

2. How long did it take you to complete each assessment?

a. Participant Demographic Sheet: _____

b. Time Diary: _____

c. General Well-being Schedule: _____

3. Is there anything that you feel should have been included in the surveys but was not?

_____

_____

_____

4. Is there anything that you would change about the surveys?

_____

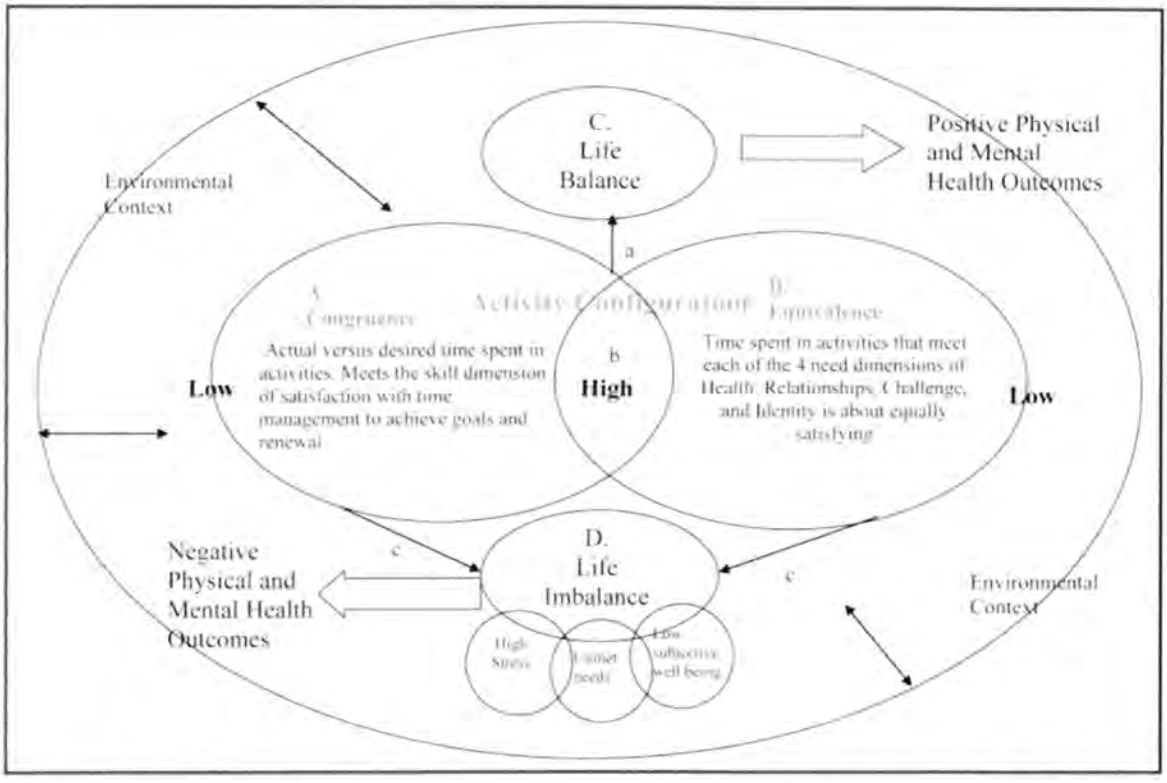
_____

_____

5. Would you have preferred to complete the surveys electronically or on paper?

_____

Appendix J: Life Balance Model



The Life Balance Model from "Validity Evidence of a Model and Measure of Life Balance" by K. Matuska, 2012, *Occupational Therapy Journal of Research, 32*(1), p. 230. Copyright 2012 by the American Occupational Therapy Foundation. Reprinted with permission.

Appendix K: Permission to Include Diagram of Life Balance Model

October 3, 2011

Jennifer Langenberg, OTR

Dear Ms. Langenberg:

Permission is hereby granted to use the figure 'Validity Evidence of a Model and Measure of Life Balance' from Dr. Kathleen Matuska's article The "Life Balance Model" that will be published in the Winter 2012 issue of *OTJR: Occupation, Participation and Health* in the discussion portion of your thesis.

The request is approved on the conditions:

__X_ Acknowledgment is made of the source of the material using the following format: from (title), by (author's name). Copyright (2012) by the American Occupational Therapy Foundation. Reprinted with permission.

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Sincerely,

Mindy A. Hecker

Mindy A. Hecker, MBA, MLS
Director of Information Resources

Appendix L: Results Sheet for Employees of Auto Parts Manufacturing Company

Occupational Balance: A Time Use Study of Industrial Shift Workers

Jennifer Langenberg

Background

What Does the Literature Say?

- Approximately 15% of full time workers in the US work an alternative shift including evenings, nights, rotating, or irregular shifts[1]; 3% of all full time workers work nights[1].
- Research indicates that shift workers, especially those who work nights, are at increased risk for: ***Shiftwork Sleep Disorder***[2], ***melatonin suppression***[3] (decreased circadian rhythms, decreased tumor suppression), ***metabolic disorders***[4-5], ***cardiovascular disorders***[4-5], ***gastrointestinal disorders***[5], ***obesity***[1], ***cognitive challenges***[6] (e.g. slow reaction time, decreased vigilance, memory impairment, decreased motivation), and ***trouble fulfilling roles to family and society***[6-10], and accidents[5].
- Shift workers are at risk for ***occupational imbalance***[11].

How Does This Relate to Occupational Therapy?

- Occupational therapists (OTs) are concerned about people's health and wellbeing. OTs use evidence from occupational science to help guide their practice[12].
- The main focus area of occupational science is to investigate how engagement in occupation influences health and wellbeing[13].

Methodology

What Was Measured?

- ***Health*** = "a state of complete physical, mental, and social wellbeing not merely the absence of disease or infirmity"[14].
- ***Subjective Quality of Life*** = how satisfied a person is with his or her life and his or her perceptions about their well-being[15]
- ***Occupational Balance*** = "equally distributed amounts of time in work, rest or sleep, and leisure occupations"[16]. In this study, a participant was deemed to have occupational balance if he or she participated in 6-10 hours of work, 6-10 hours rest/sleep, and 6-10 hours leisure.

Who Participated in the Study?

- Full time employees of BorgWarner Morse TEC in Ithaca, NY

What Measurement Tools Were Used?

- Demographic Sheet (measured demographic info and basic health status)
- Time Diary (measured occupational balance)
- Psychological General Well-being Schedule (measured subjective quality of life (SQOL))

Jennifer Langenberg
Occupational Therapy Graduate Student
Ithaca College

Results

Demographics

- ***21 Participants***
  - Current work shift: 1st shift = 3 people, 2nd shift = 11 people, 3rd shift = 7 people
  - Gender: 10 females, 9 males, 2 unspecified
  - Years on work shift: 0-4 years = 9 people, 5-9 years = 1 person, 10-14 years = 5 people, 15-19 years = 4 people, unspecified = 2 people
  - Avg hours per work week: 40-44 hrs = 9 people, 45-49 hrs = 3 people, 50-54 hrs = 4 people, over 60 hrs = 1 person

Activity Participation

- Most common activities listed in order (most common → least common): Sleep, Work, Meals, Driving, Watch TV/ Movie, Housework, Shopping, Reading, Physical Recreation, Computer Use, Karaoke/ Drinks
- On average, 1st and 2nd shift workers slept once each day, 3rd shift workers slept two times each day (napping)

Satisfied with Balance

- 10 people (48%) were satisfied with their balance in work, rest/sleep, and leisure.
- Of those who were not satisfied: 4 people would like more rest/sleep, 3 people would like more leisure time, 1 person would like more social participation, 1 person would like less work

Health Status

- Cardiovascular problems = 1 person, Hypertension = 3 people, Diabetes = 4 people, Digestive problems = 5 people, Weight problems = 10 people, Mental health diagnosis = 0 people, Cancer = 0 people
- No significant difference between 1st/ 2nd shift and 3rd shift

Cognition

- 3rd shift workers were significantly more likely to experience excessive sleepiness during awake hours than 1st/ 2nd shift workers ($r = .593$, $p = .006$)
- No significant difference between the work shifts in: trouble sleeping, slow reaction time, impaired memory, trouble with concentration, low level of motivation/ self-initiation, or trouble fulfilling roles to family and society.
- However, it can be seen that of those who responded often or frequently had trouble fulfilling roles to family and society, all the respondents were 3rd shift workers.

Subjective Quality of Life (measured by PGWBI)

- In a previous study[17], a global score of 0-60 = severely distressed, 61-72 = moderately distressed, and 73 and above = positive wellbeing.
- In this study, all 3rd shift workers and the majority of 1st/2nd shift workers scored severely distressed.
- 3rd shift workers were significantly more likely to score lower on all subcomponents of the PGWBI: anxiety, depressed mood, positive wellbeing, self-control, general health, and vitality ($p = .014 - .075$).

Occupational Balance

- 26% of the participants were deemed to have occupational balance leaving 73% of the participants had occupational imbalance.

Sleeping Habits

Significant findings or trends towards significance were found between:

- Decreased hours of sleep and
  - Decreased self-control score on PGWBI
  - Decreased general health score on PGWBI
  - Decreased vitality score on PGWBI
  - Decreased global score on PGWBI
  - Decreased level of satisfaction with balance between work, rest/sleep, and leisure
- Napping (sleeping more than once each day)
  - Increased usage of supplements prescribed by a physician
  - Decreased anxiety score on PGWBI
  - Decreased depressed mood score on PGWBI
  - Decreased positive wellbeing score on PGWBI
  - Decreased self-control score on PGWBI
  - Decreased general health score on PGWBI
  - Decreased vitality score on PGWBI
  - Decreased global score on PGWBI
- Note – the lower the score (anxiety, depressed mood, vitality, etc), the poorer the quality of life.

Discussion

The literature review established that shift workers, especially night shift workers, have a higher prevalence of adverse health conditions including physical and cognitive impairments[7] as well as lifestyle choices such as smoking[10]. It has been the experience of the researcher, through talking with night shift workers at BorgWarner and other companies, that fatigue, concentration, and memory are in deed challenges for this population. Shift workers have also expressed to the researcher a shared experience of the challenge to socialize with others and fulfill responsibilities to family and society. However, this study did not support those findings.

In Wilcock's theory on occupational balance, she indicated that shift workers are at risk for occupational imbalance[12]; this study supports those findings. Although this study did not compare shift workers with non-shift workers, 73% of the sample was classified as having occupational imbalance. There was not a significance, however, between the shifts. This study also indicated that there is a relationship between work shift and subjective quality of life.

There are a number of reasons by the significance of the findings was low. First, the sample size was small. In many cases, the number for participants for a given category or response was under 5, so the statistics may not have been as significant as it would have been with a larger sample. It can be seen from some of the graphs from the study that a trend was appearing, even though the statistics did not report any significance.

Second, the two measures that did not report significance (the demographic sheet and time diary) were researcher-developed. The demographic sheet was framed around the evidence from the literature review, but reliability was not established. The time diary was mainly descriptive allowing the participants choice in how much or little information they wanted to provide. Many of the time diaries were returned with vague answers when reporting in which activities they participated. Also the category of self-care was inconsistently categorized as work, rest, or leisure among the participants.

Third, the time of year and place of work may have had an influence in who responded to the survey. Recruitment for participation occurred just before the holidays during a time in which employees were working over time. Those who may have been at a greater risk for occupational imbalance may have been too busy or exhausted to participate in the study. Also, the incentive was $100, which may not have been a motivating incentive.

Finally, BorgWarner is a health-promoting company with an on-campus health department. This may have had an impact on the overall healthy nature of the participants in the sample.

The field of occupational science needs to establish a consistent definition of occupational balance. While Marino-Schorn[17] and traditional occupational therapists[18] focus on temporal aspects of occupational engagement, Christensen and Matsuka[19] focus on meaning and value. Ann Wilcock[12,20-23], who developed the concept of occupational imbalance, uses a needs-based approach. While all the theorists agree that occupational balance leads to a greater quality of life and positive well-being, it is unclear what exactly makes up occupational balance. Christensen and Matsuka's theory on lifestyle balance[19] is emerging and seems to be more in line with the current views in the occupational therapy profession. They are in the process of publishing standardized assessments to measure lifestyle balance. This would be a great area to explore, given that the time diary method is not very valid or reliable when diagnosing.

It can be assumed that occupational balance differs for people across the lifespan and during different phases on life. An infant may need more rest than the other categories. A young child may want and need more play than work or rest. A young adult who is beginning a career may desire more work so he or she can feel a sense of contribution to their society and profession. A retiree may feel they deserve to relax and desire more leisure. This researcher recommends further research in what constitutes occupational balance and how it changes across the lifespan.

In addition, given that the literature and this study support the relationship between shift work and occupational balance and subjective quality of life, it is important to keep this population as a forefront of additional research. Most of the published research on night shift workers is based on the field of nursing. There are several professions that incorporate 24-hour shift systems including police force, human services, entertainment, and more. It is the duty of health care providers to promote health and wellbeing to populations at risk.

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Appendix M: Strategies for Shift Workers –

Tip Sheet for Employees of Auto Parts Manufacturing Company

Strategies to Promote Positive Wellbeing and Quality of Life Among Shift Workers[1-2]

Prepared for the Employees of (company name) in Ithaca, NY

Routine and Occupational Balance

- ***How much time are you devoting to work? Rest and Sleep? Leisure? Are you satisfied with this balance?*** If not try to incorporate that area you are lacking into your daily routine. In most cases, people have the time to do the things they want and need to do, it's just a matter of good planning and time management.
  - Example 1 (more rest): try going to sleep 15 minutes earlier than you usually do. Slowly increase that amount by 15 minutes until you are satisfied with the amount of sleep you are getting
  - Example 2 (more leisure): plan a weekly activity and routine time (i.e. each Thursday evening, I will spend 1 hour doing…)
- ***Can you structure your day to avoid excess time use?***
  - Example 1: lay out your clothes the night before so when you awake, you do not have to spend time/ energy searching for clothes
  - Example 2: plan out your meals ahead of time so you limit the shopping trips and so you do not have to spend time planning meals each day
- ***See attached 24-hour cycle.*** Write in the times that activities must occur each day (i.e. work) and times that you plan on doing activities (i.e. 5am = shower/ dress/ eat breakfast)

Sleeping Habits

- Sleep and You
  - Determine how much sleep is a good amount for you to awake refreshed and have energy for your day.
  - Complete the attached Epworth Sleepiness Scale to determine if you should consult with a sleep specialist
- Sleep Routine
  - Establish a predicable bedtime routine (e.g. brushing teeth, locking doors, setting alarms, getting dressed, etc.)
  - Establish regular times for awaking and sleeping (including weekends!)
  - Avoid taking long naps (more than 15 minutes); try to get all your sleep at one time
  - Exercising during the day (but not within 4 hours before sleeping) will help your body fall asleep easier and stay asleep.
  - Don't go to bed too hungry to too full; establish a predicable routine for meal times
  - Watch caffeine, nicotine, and alcohol consumption; avoid use of these within 1 hour of sleeping.
  - Leave the bedroom if you are lying in bed awake for more than 20 minutes and return to bed when sleepy
- Sleep Environment
  - Use bed only for sleep and sex
  - Make the room as dark as possible.
    - For night shift workers, some tips include: block out shades, lining windows with aluminum foil, eye shades, ear plugs
  - Ensure the room is a preferred temperature for sleeping
  - Control humidity
  - Invest in a good bed/ mattress
  - Turn off devices that may be stimulating (e.g. cell phones, TV, radio)

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Online Resources

- Centers for Disease Control and Prevention: Sleep and Sleep Disorders http://www.cdc.gov/sleep/
- Epworth Sleep Centre http://www.epworthsleepcentre.com.au/About.htm
- National Heart, Lung, and Blood Institute: Your Guide to Healthy Sleep http://www.nhlbi.nih.gov/health/public/sleep/healthysleepfs.pdf
- National Sleep Foundation http://www.sleepfoundation.org/

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[1] Based on research findings from Langenberg, J. (2010). Occupational balance: A time use study of industrial shift workers. (Unpublished master's thesis). Ithaca College, Ithaca, NY.

[2] Picard, M. (2011). *Addressing sleep, sleep preparation & sleep participation in clinical practice: SC306* [PDF document]. Retrieved from http://aota.org

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Epworth Sleepiness Scale

Developed by Dr. Murray Johns

How likely are you to doze off or fall asleep in the following situations, in contrast to feeling just tired?

This refers to your usual way of life in recent times.

Even if you have not done some of these things recently try to work out how they would have affected you. Use the following scale to choose the most appropriate number for each situation.

0 = no chance of dozing
1 = slight chance of dozing
2 = moderate change of dozing
3 = high chance of dozing

SITUATION	CHANCE OF DOZING
Sitting and reading	
Watching TV	
Sitting inactive in a public place (e.g. a theater or meeting)	
As a passenger in a care for an hour without a break	
Lying down to rest in the afternoon when circumstances permit	
Sitting and talking to someone	
Sitting quietly after a lunch without alcohol	
In a car, while stopped for a few minutes in traffic	
Total Score	

Total Score = 1-6	Congratulations, you are getting enough sleep!
Total Score = 7-8	Your score is average
Total Score = 9 and up	Seek the advice of a sleep specialist without delay

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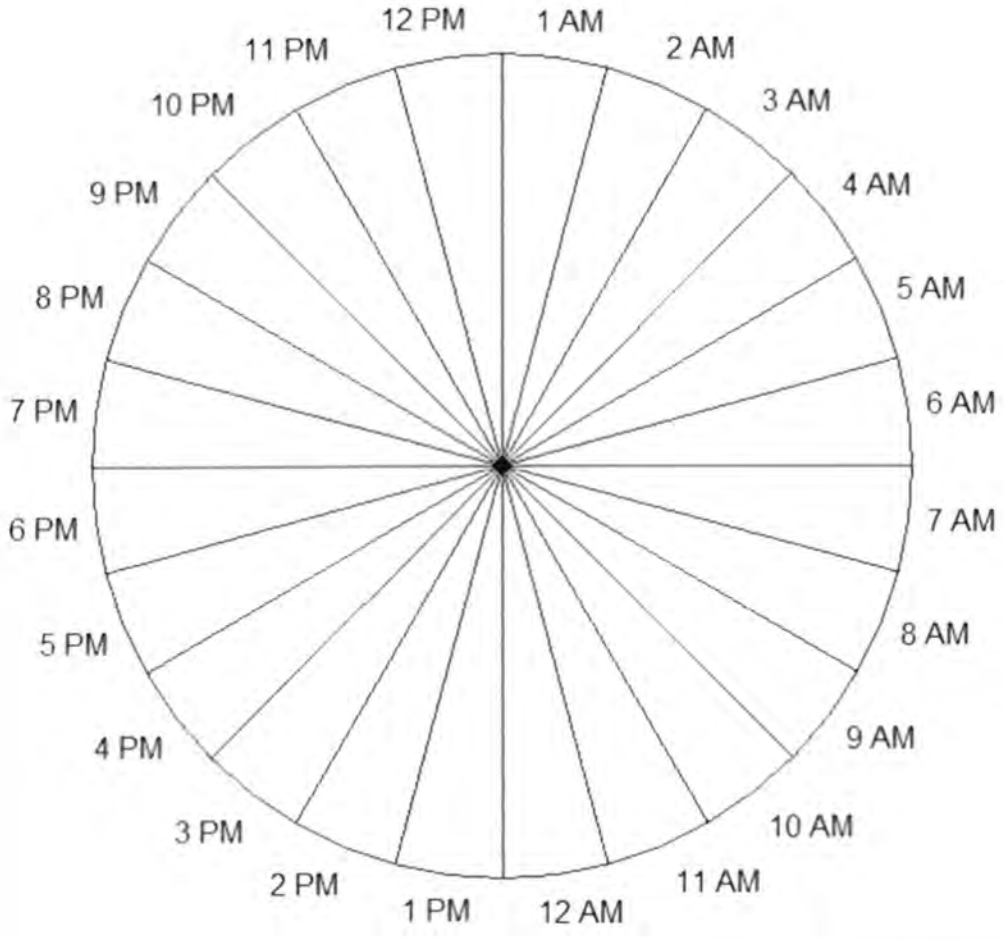
4

Daily Planner



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